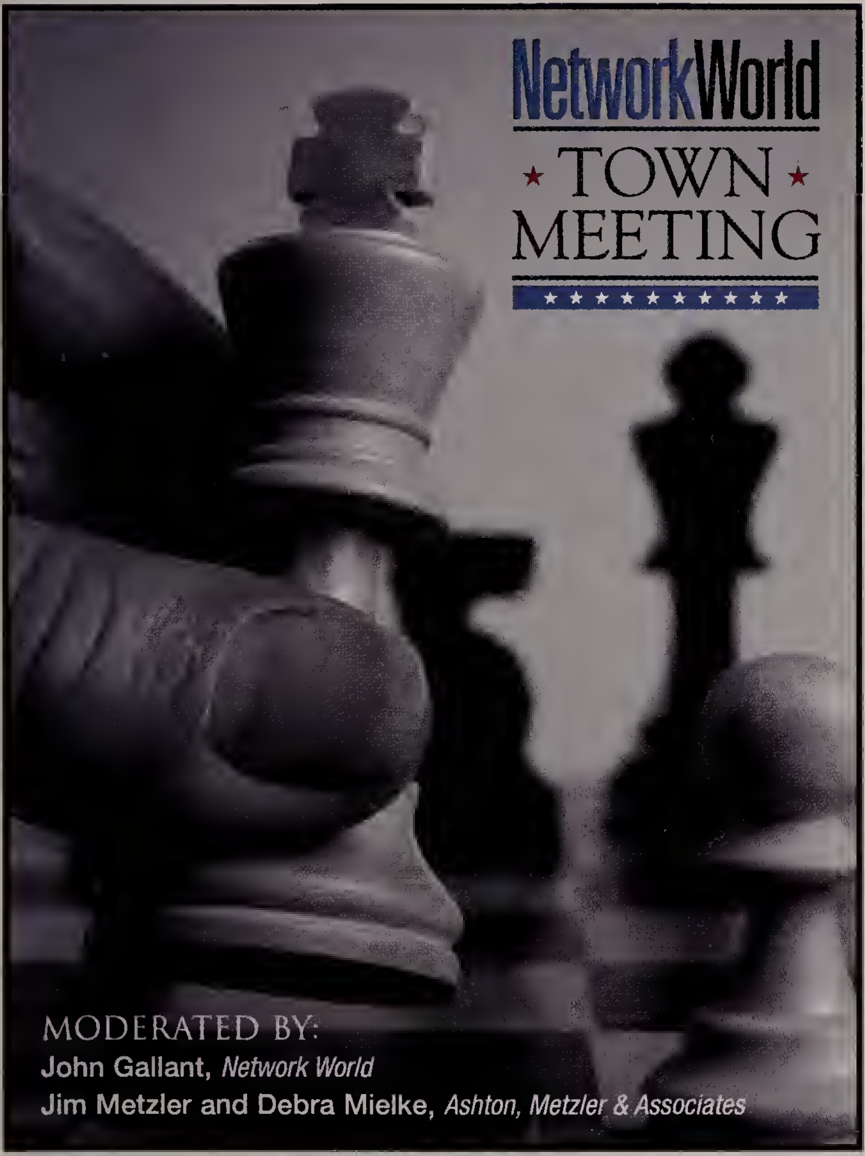
The newsweekly of enterprise network computing

NetworkWorld

May 17, 1999 Volume 16, Number 20 www.nwfusion.com

CONTEMPLATING THE NEXT MOVE FOR YOUR WIDE AREA NETWORK?



NetworkWorld

★ TOWN ★ MEETING

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

MODERATED BY:
John Gallant, *Network World*
Jim Metzler and Debra Mielke, *Ashton, Metzler & Associates*

Get the Facts at...

STATE OF THE WAN:℠

Maximizing the Potential of Frame Relay, ATM and Emerging Network Services

OVERVIEW

The era of expensive, inflexible leased-line networks is over. Frame Relay is enjoying explosive adoption and ATM may well be the high-speed WAN technology of choice. Of course, you can't forget the phenomenal rise in usage and interest in TCP/IP as evidenced by the growth of the internet and IP-based Virtual Private Networks (VPNs). So what is your next move? Public Frame Relay? ATM in the backbone? TCP/IP everywhere? Or perhaps a new breed of Network Service Providers (NSPs) that are just beginning to come on line.

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Attend this FREE EVENT and position your WAN for the future!

- Compare and contrast the benefits of ATM, Frame Relay and other emerging Wide Area Networking technologies and services.
- Learn to lower the cost of operations and support by effectively placing your voice traffic over Frame Relay, ATM or other data transmission services.
- Analyze the service differences between leading Frame Relay and ATM service providers.
- Find out what Service Level Agreements really mean and how you can effectively implement and manage them.
- Understand the different technologies that support Qualities of Service and the requirements for providing end-to-end QoS including equipment, reporting and people.

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VIP#: WRAP

See inside for complete details!

NEWSPAPER

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FREE EVENT!
SEMINAR AGENDA

See the Sponsor Showcase for important information from leading WAN vendors.

8:00 – 9:00

Registration and continental breakfast

Take this opportunity to network with your peers and establish relationships with vendors who can aid you in reaching your WAN management goals.

9:00 – 9:30

Moderator's address – Technology Overview

Jim Metzler will provide an overview of today's high-speed Wide Area Networking technologies and services and how they link with your business goals. Topics include the current status of ATM and Frame Relay, the drivers for emerging WAN technologies and services, such as public IP, and the calculation of ROI for a WAN implementation or upgrade.

9:30 – 10:30

Vendor Strategies in the WAN Today

In response to Jim's keynote, each presenting sponsor will provide big picture advice on building, buying, implementing, and managing technology and network services in today's rapidly changing WAN environment. Topics include: end-to-end QoS, defining and enforcing Service Level Agreements, getting payback on existing and emerging services and the trend towards convergence of voice, data and video in the network.

Jim Metzler, Debra Mielke and John Gallant will then further probe these issues and direct questions from audience participants.

10:30 – 11:00

Break and Product Information

11:00 – 12:30

Breakout Sessions · SEE DETAIL ➢

- **Frame Relay Implementation and Evolution**
- **ATM Implementation and Evolution**

12:30 – 1:30

Complimentary Lunch and Product Information

1:30 – 3:00

Breakout Sessions · SEE DETAIL ➢

- **Frame Relay Technical Issues and Options**
- **ATM Technical Issues and Options**

3:00 – 4:00

The Future

John Gallant will lead a hard-hitting discussion on where the industry is headed with wide area technologies 12 to 24 months out. The panel, including Jim Metzler and Debra Mielke, will explore the issues that may arise, the technology and service solutions that can be expected, and how customers can and should develop their networking strategies. Topics include: the impact of Network Service Providers (NSPs) on competition, the future of IP backbones and their effect on the Frame Relay and ATM landscape, next-generation WAN services, migration between technologies, and application-based services.

4:00

Raffle and Wrap-up

BREAKOUT SESSION DETAIL

11:00 – 12:30

Morning Breakout Sessions

Frame Relay Implementation and Evolution

Jim Metzler will give an introduction on the implementation issues you face for increasing performance or adding advanced Frame Relay services.

Using case studies, the vendor panelists will provide Frame Relay implementation and migration strategies. Topics include: upgrading and ordering your Frame Relay network, outsourcing vs. managing your own network, defining and implementing end-to-end QoS, implementing two-tiered SLAs, planning for disaster recovery, and VPN integration in your Frame Relay strategy.

Jim Metzler will then explore these issues and direct questions from the audience.

ATM Implementation and Evolution

Debra Mielke will give an overview of the implementation issues you face when using or contemplating the use of ATM. Of particular interest is how to access and maximize the use of seamless ATM (ATM supplied by carriers as the underlying transport layer) in support of new integrated service offerings.

Using case studies, the vendor panelists will provide specific ATM implementation and migration strategies based on their offerings. Topics include: public vs. private ATM implementations, traditional native ATM carrier services, taking advantage of international ATM services where they exist, QoS within ATM, and defining SLAs for ATM.

Debra Mielke will then explore these issues and direct questions from the audience.

1:30 – 3:00

Afternoon Breakout Sessions

Frame Relay Technical Issues and Options

Jim Metzler will introduce the technical and management issues associated with Frame Relay and emerging network services.

The panelists will address issues surrounding the different vendor and service provider offerings as well as user adoption strategies for Frame Relay. Topics include: configuration and topology of an evolving Frame Relay network, interworking with existing infrastructures, voice, fax and video over Frame Relay, SNA over Frame Relay, evaluating Frame Relay equipment and services, monitoring contracted services, and knowing when to add more capacity and when to save.

Jim Metzler will then explore these issues and direct questions from the audience.

ATM Technical Issues and Options

Debra Mielke will introduce the technical and management issues associated with ATM and emerging network services.

The panelists will address issues surrounding the different vendor architectural and support approaches as well as offer user adoption strategies for ATM. Topics include: ATM interoperability with Frame Relay; voice, video and IP over ATM; evaluating equipment and services; understanding support of ATM CPE vs. routers with ATM ports; and carrier support of services from ordering and provisioning VCs/VPs (Virtual Circuits/Virtual Paths) to reporting and pricing.

Debra Mielke will then explore these issues and direct questions from the audience.

LEARN FROM THE EXPERTS

John Gallant

John Gallant is Editorial Director of *Network World*, one of the fastest growing publications in the computer/communications industry. With more than 16 years experience covering the industry, Gallant sets the strategic directions for the newsweekly, which serves over 164,000 network IS managers. As senior vice president, he also guides Network World Publishing, Inc.'s other editorial ventures.

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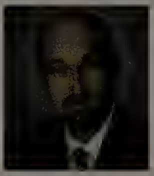

Jim Metzler

Jim Metzler is a widely recognized authority in both network technology and its business applications. With over 28 years of experience, Dr. Metzler has served as engineering manager for high speed data services for a major Telco and managed networks at two Fortune 500 companies. He is a member of the Networld + Interop Planning Committee and is co-authoring a book entitled *The Successful Deployment of Layer 3 Switching.*

Ashton, Metzler & Associates
Leverage Technology and Talent for Success

Debra Mielke

Debra Mielke has over fifteen years of experience at the leading edge of data communications technologies and services. She works with providers of communications services, and software and hardware vendors worldwide to develop unique market and differentiation strategies. Formerly, Ms. Mielke was Director of Consulting for TeleChoice, Inc. There she performed market research and developed market and product strategies for major computer and retailing companies.

VIP#: WRAP

1999 EVENT TOUR

New York, NY . . . . . . June 2. . . . . . NY Marriott Financial Center
Boston, MA. . . . . June 3. . . . . . The Colonnade Boston
Dallas, TX . . . . June 16. . . . . The Dallas Grand Hotel
Chicago, IL . . . . June 17. . . . . Hyatt Regency O'Hare
Washington, DC . . . . June 29. . . . . JW Marriott
Atlanta, GA . . . . June 30. . . . . Cobb Galleria Centre
San Francisco, CA. . . July 12 . . . . . Grand Hyatt San Francisco
Irvine, CA . . . . July 13 . . . . . Sheraton Newport Beach

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NEW LOOK NETFINITY IBM is adding muscle to its PC server platform. Page 6.

PERSONALITY PROFILES How personality testing can help you build a compatible team. Page 57.

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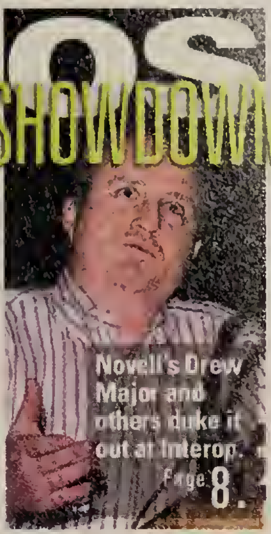
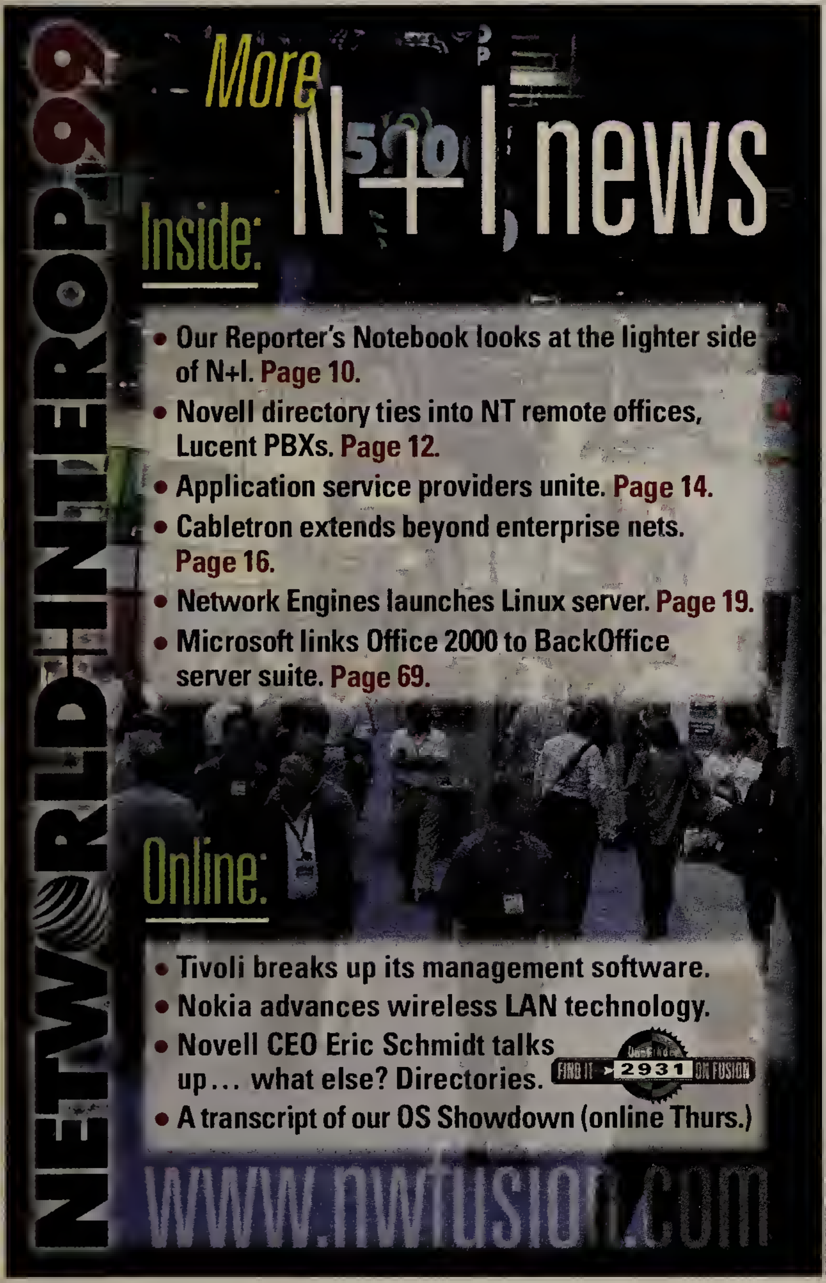


OS SHOWDOWN

Novell's Drew Major and others duke it out at Interop. Page 8.

DAVID WAITE



More N+I news

Inside:

- Our Reporter's Notebook looks at the lighter side of N+I. Page 10.
- Novell directory ties into NT remote offices, Lucent PBXs. Page 12.
- Application service providers unite. Page 14.
- Cabletron extends beyond enterprise nets. Page 16.
- Network Engines launches Linux server. Page 19.
- Microsoft links Office 2000 to BackOffice server suite. Page 69.

Online:

- Tivoli breaks up its management software.
- Nokia advances wireless LAN technology.
- Novell CEO Eric Schmidt talks up… what else? Directories. FIND IT ▸ 2931 ON FUSION
- A transcript of our OS Showdown (online Thurs.)

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DAVID WAITE

Interop till you drop

BY *NETWORK WORLD* STAFF

LAS VEGAS — NetWorld+Interop 99 last week had a definite edge — the leading edge.

The annual Las Vegas extravaganza not only showed the latest and greatest, but threw in a fair amount of the up and coming to boot. The hottest of the hot technologies were virtual private networks (VPN), quality of service (QoS) and voice over IP.

At the show, one of the things *Network World* learned is that 3Com will announce a new version of its DynamicAccess LAN adapter software in June that works with non-3Com network interface cards.

DynamicAccess 2.0 will add QoS, policies and other "intelligence" to any Network Driver Interface Specification

See **Interop**, page 16

AT&T serves up voice on frame

Managed service uses Motorola multiservice gear.

BY DAVID ROHDE

LAS VEGAS — AT&T, the carrier with the most to lose from voice-over-data technologies, is nonetheless planning to dive deeper into the market, piggybacking voice on the data network service favored by most big enterprise users: frame relay.

The telecom giant next month will announce the AT&T Managed Multimedia Networking Service (MMNS), a combined voice and data frame relay service. Under MMNS, AT&T will install and manage Motorola Vanguard multiservice frame relay access devices (FRAD) at branch and retail locations for users of all sizes.

Unlike several past announcements of converged services that aggregate voice and data traffic, including AT&T's own Integrated Network Connection (INC), MMNS is expected to be ready to go on Day One.

AT&T officials told *Network World* they have already installed the service for pharmaceutical and banking companies with thousands of locations. The carrier also was discreetly demonstrating the service in its booth at NetWorld+Interop 99 here last week.

See **AT&T**, page 68

War on spam claims legit e-mail

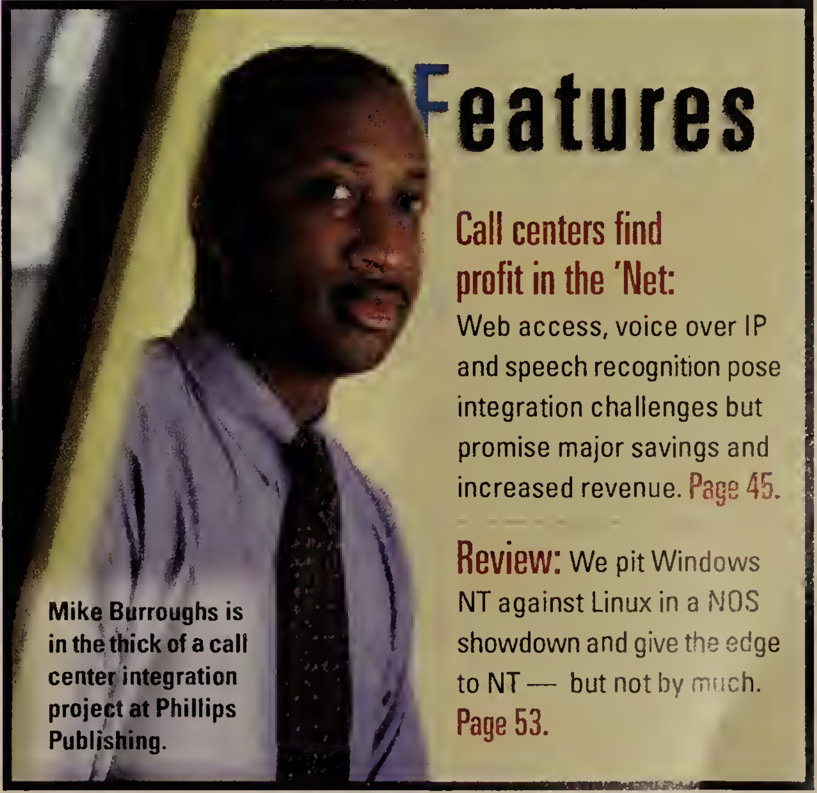
BY PAUL MCNAMARA

In the interest of fighting spam, Tivoli has trained its in-house e-mail system to reject up to 5% of all incoming messages, even though the company knows that some of those messages are legitimate business correspondence. Senders of the bounced e-mail get a link to a Web page (www.tivoli.com/spam.html) that explains the policy.

Any resulting inconvenience for customers or employees is a reasonable price to pay for spam protection, contends Steve Jones, manager of enterprise network services at Tivoli in Austin, Texas. While Jones is not alone in that assessment, the unusually aggressive tactic has sparked debate within the company and among

See **Spam**, page 68

Newspaper $5.00



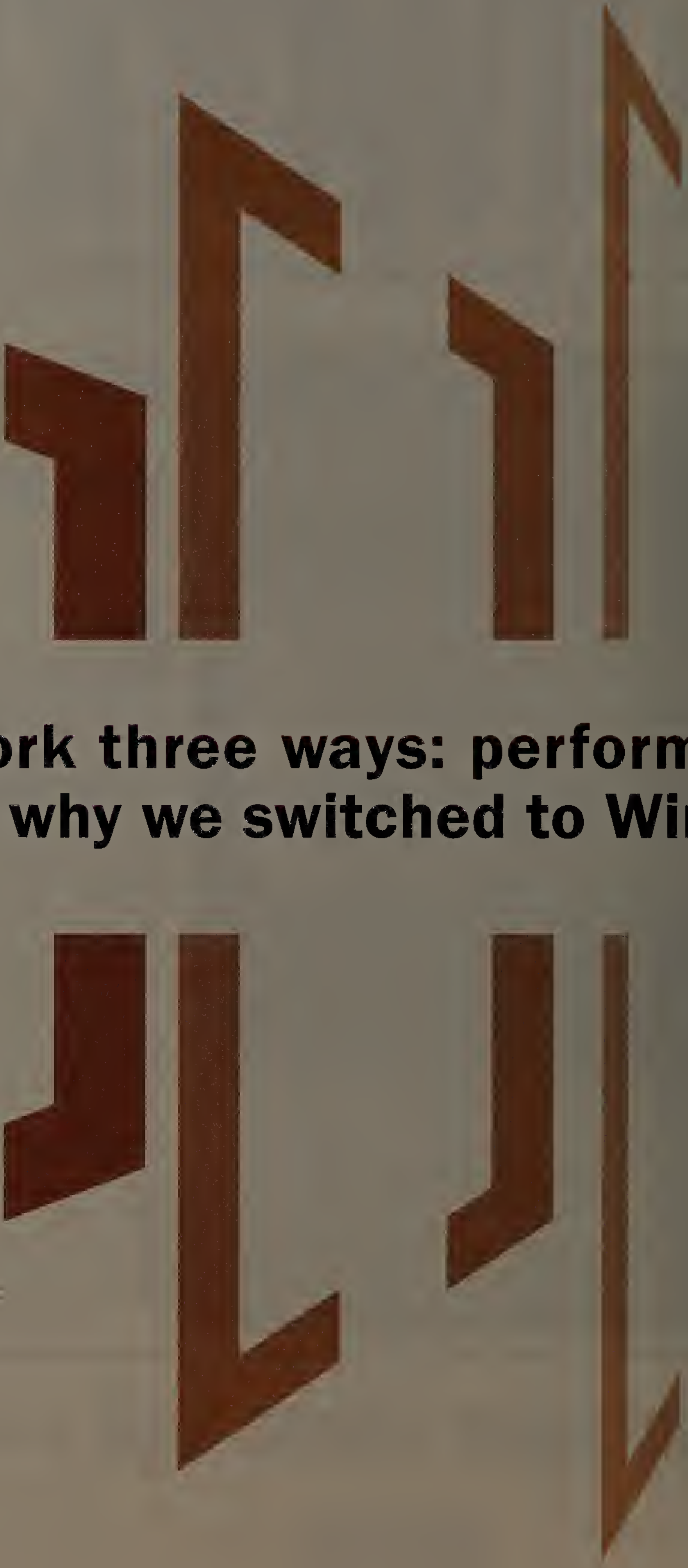
Features

Call centers find profit in the 'Net: Web access, voice over IP and speech recognition pose integration challenges but promise major savings and increased revenue. Page 45.

Review: We pit Windows NT against Linux in a NOS showdown and give the edge to NT — but not by much. Page 53.

Mike Burroughs is in the thick of a call center integration project at Phillips Publishing.

DANUTA OTFINOWSKI



"We judge our network three ways: performance,
performance. That's why we switched to Windows

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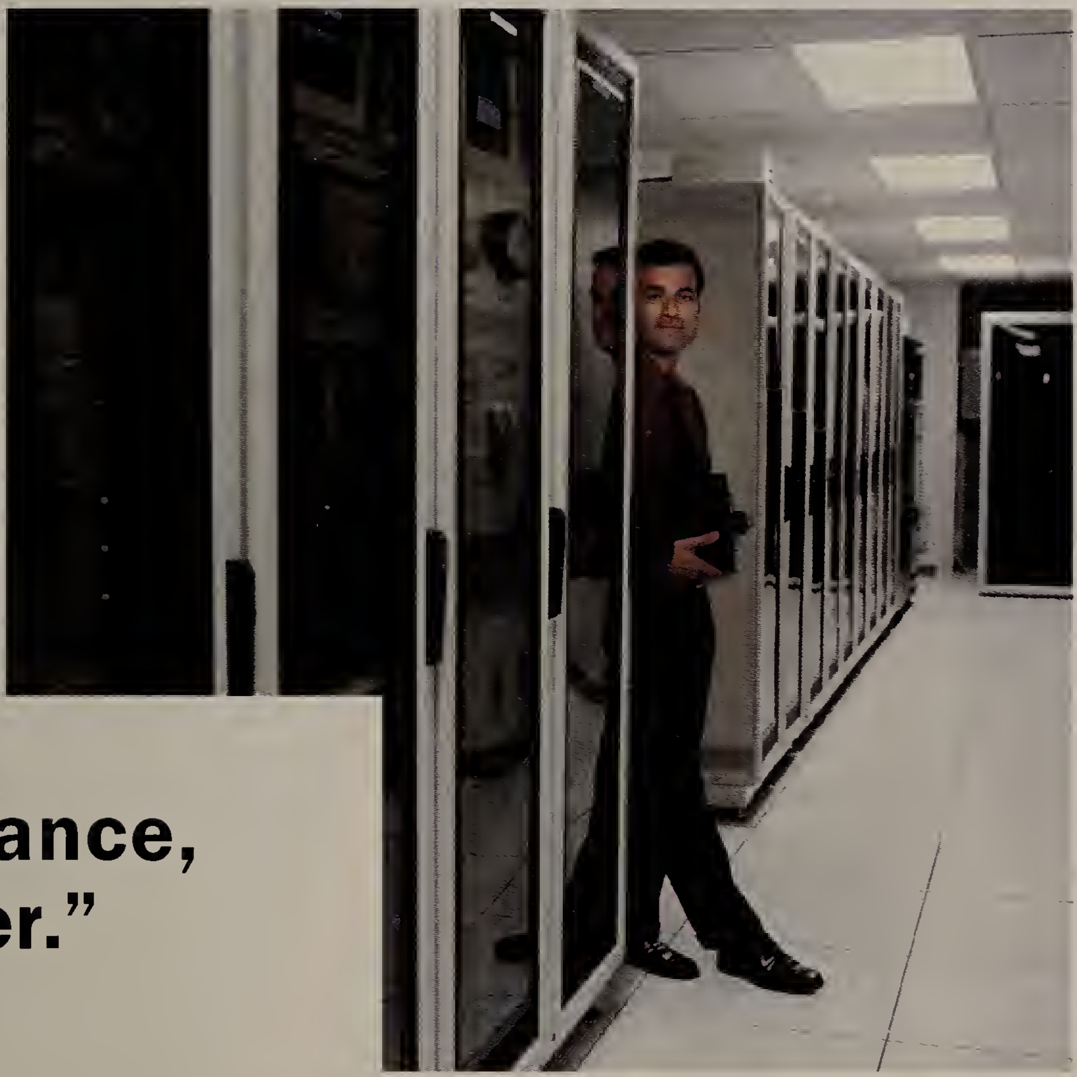

performance,
NT Server.”

“We used to run NetWare and OS/2, but I thought we could get better performance using one platform. So we moved to Microsoft® Windows NT® Server. Obviously, it was a big decision to switch, but this network upgrade has really worked out for us. Our customers get faster service. Our loan consultants can close more loans. And the company has a competitive advantage. Everybody wins.”

Jerry Gross, CIO
Countrywide Home Loans, Inc.

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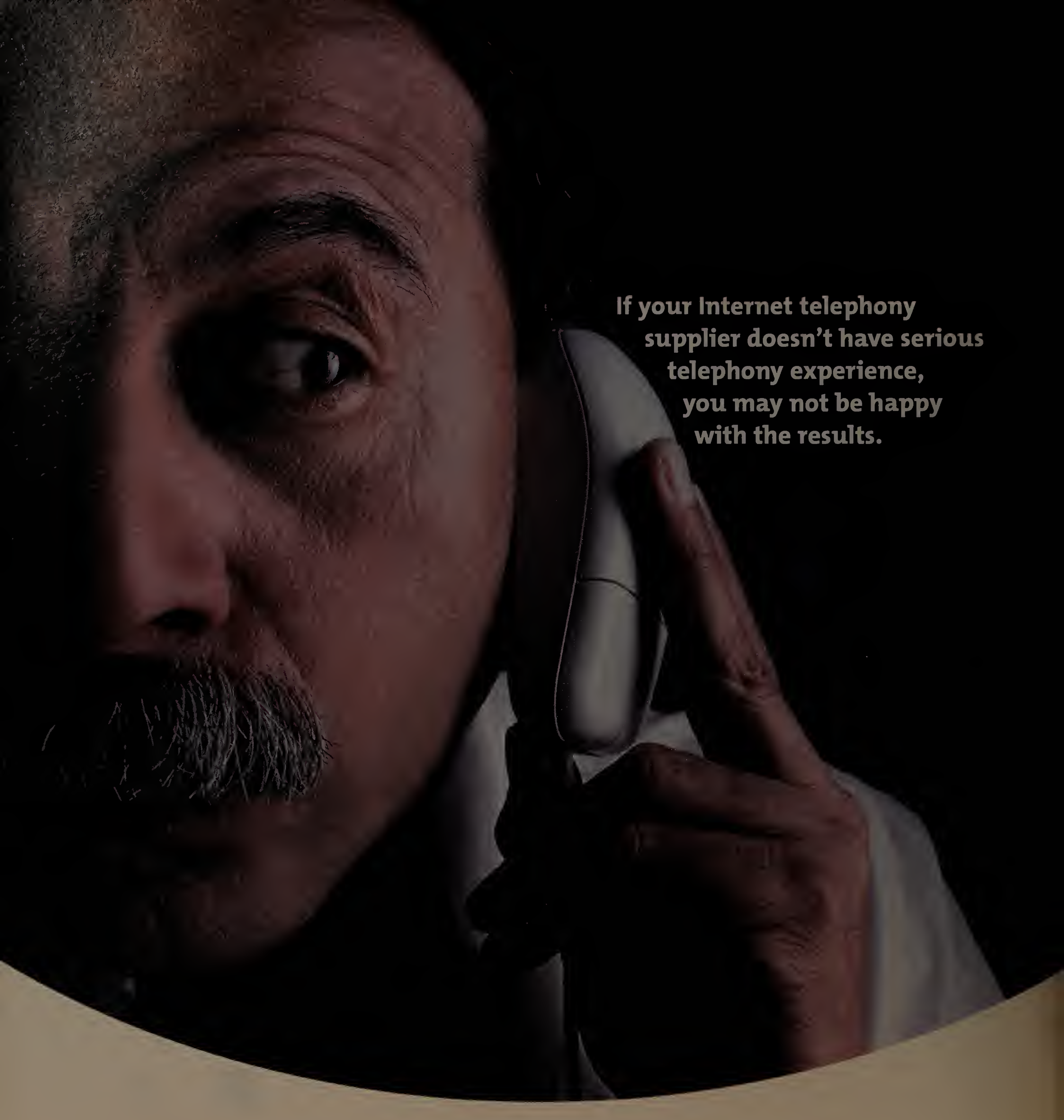
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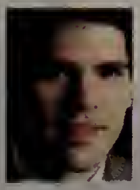
THIS WEEK ONLINE



Keeping Current. Last week, Fred McClimans and other MCI WorldCom customers located in northern Virginia lost service for more than a day when an OC 48 fiber was cut. In an open letter to MCI WorldCom Chairman Bernie Ebbers, McClimans wonders what happened to the redundancy that the carrier had promised its customers. **DocFinder: 2938**

Home networks. So how do you crimp Cat 5 wire? A Fusion staffer who was trying to wire his house for Ethernet ran into all sorts of problems, starting with an electrician who installed wires but no connectors or outlet boxes. Read his saga, then give him your sage wiring advice. **DocFinder: 2943**

Firewalls. In July, we'll be doing an in depth buyer's guide to firewalls. What issues should we focus on? Tell us in our firewalls questionnaire. **DocFinder: 2942**

Who are you? Speaking of July and questionnaires, another July feature will be our first You Issue — an entire issue devoted to network professionals and their careers and lives. Help us out by taking our Favorites survey. No, we won't ask you how many routers or switches you have. But we will ask you what your favorite soda and sports are, who you like in the movies and whether it's Star Trek or Star Wars for you. You know, we're only asking the really important stuff. **DocFinder: 2524**

ISDN. New feature on Fusion: ISDN availability checker. Working with Telco Exchange, we've set up a service that lets you get pricing and availability for ISDN in a given area. **DocFinder: 2944**

How to get onto Network World Fusion

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

NetworkWorld

MAY 17, 1999

Table of Contents

Departing *Network World* Features Editor Paul Desmond urges network managers to interact more with the trade press. Page 40.

NEWS

6 IBM Netfinity servers to get a new look.

8 Network operating system vendors battle it out.

8 Intel snaps up company in stealth deal.

10 Reporter's Notebook: The lighter side of Interop.

12 Novell stretches to branch offices with NDS.

14 Application Service Providers make noise at Interop.

16 Cabletron looks beyond the enterprise.

69 Microsoft starts stitching together BackOffice, Office.

INFRASTRUCTURE

19 Are megarouters coming to your network soon?

20 NTP Software clamps controls on NT and Exchange.

22 Altiga VPN concentrators to back up one another.

23 Kevin Tolly: The other Y2K story.

CARRIERS & ISPs

25 Bandwidth management help is on the way.

26 David Rohde: FCC is the wrong place to go for marketing help.

ENTERPRISE APPLICATIONS

29 Review: BoostWeb Enterprise bolsters Web applications.

33 Manage.com puts XML to work.

34 Scott Bradner: Should I be worried?

TECHNOLOGY UPDATE

35 Public-key encryption for dummies: Your online passport to the electronic world.

Special Focus

NUMBER PORTABILITY

How changing carriers just got easier for you. Page 28.

38 Gearhead: Gadget Heaven — A pen-based computer and a digital camera.

MANAGEMENT

57 Psychological profiles: Personality tests can help you build a compatible workgroup.

OPINIONS

40 Editorial: Some good parting advice.

41 Wayne Spivak: Whois — A paradox of privacy vs. public need.

41 Thomas Nolle: How the FCC may have saved the CLECs.

70 Backspin: Out-tasking for the taking.

70 'Net Buzz: Software.com's IPO; Lunacy at Edward Jones.

Net Know-It-All ....Page 10
Ask Dr. Intranet ....Page 35
Message Queue ....Page 40
Editorial and advertiser indexes ......Page 67

HOW TO CONTACT US

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FEATURES

Call centers find profit in the 'Net

Web access, voice over IP and speech recognition pose integration challenges but can mean major savings and increased revenue. Page 45.

Mike Burroughs of Phillips Publishing.

ROAMING ABOUT CAMPUS: A Florida law school uses wireless technology as a differentiator. Page 49.

POWER CLUSTER: Entertainment companies look to render farms to tackle digital effects and animation. Page 51.

REVIEW: We pit Windows NT against Linux in a NOS showdown and give the edge to NT – but not by much. Page 53.

DANUTA OTFINOWSKI

NEWS BRIEFS, MAY 17, 1999

East bests West at Net Bowl 99

For the second straight year, East defeated West in a battle of technological wits. At NetWorld+Interop 99, executives from the hottest companies in networking showed off their industry knowledge at Net Bowl 99, *Network World's* third annual event to benefit Net Day. Net Day helps schools across the country hook up to the Internet.

DAVID WAITE

The West Coast team's Phyllis McCullagh takes a question at Net Bowl 99.

Howard Anderson, president of The Yankee Group, led the East Coast team to a 130-70 victory. Joining him in the winners' circle were Mike Skubisz of Cabletron, Matt McConnell of Compatible Systems, Jonathan Cohen of AT&T, Doug Ruby of Lucent and *Network World* columnist Mark Gibbs.

Gordon Stitt, CEO of Extreme Networks, led the West Coast team, which included Clyde Jenkins of ADC Kentrox, Phyllis McCullagh of Gateway, Doug Walker of WRQ, John Hart of 3Com and Larry Lang of Cisco.

While many of the questions downright stumped the two teams, at least the answers they offered were entertaining: "What is the name of the wireless venture formed by Microsoft and Qualcomm?" "Not a Clue, Inc.?" AT&T's Cohen answered. (Answer: Wireless Knowledge)

Compaq's executive exodus

It all started when Compaq Chairman Ben Rosen ousted CEO Eckhard Pfeiffer last month. Since then, plenty of other Compaq executives have followed Pfeiffer out the door. The latest official to resign is John Rando, senior vice president and general manager responsible for Compaq's services and support division. Rando's departure follows on the heels of Mike Heil's exit. Heil was Compaq's top sales and marketing executive. Earlier this month, Compaq also lost Kenny Kurtzman, who was senior vice president and general manager of compaq.com, the company's newly created business unit charged with selling Compaq products and services over the Internet.

Stretching the boundaries of ATM

MCI WorldCom last week announced commercial availability of local ATM service in 350 cities — actually groups of locations in 81 large metropolitan areas. The move fulfills a promise to compete even more heavily with regional Bell operating companies for broadband services. Local ATM at T-1 and T-3 speeds will ride on the company's Cisco ATM backbone. Meanwhile, Equant Network Services announced a managed global ATM service in 42 countries to accompany its existing frame relay, IP and voice offerings. Service is available at up to OC-3 speeds.

Microsoft Web warning

Enterprise users who want to protect sensitive data stored on Microsoft's Site Server 3.X or Internet Information Server 4.X better check those servers for three dangerous Active Server Page files that could create a security risk. The files — showcode.asp, viewcode.asp and codebrws.asp — give anyone with a Web browser access to unrestricted files on the server. Microsoft is expected to issue a patch this week to address the vulnerabilities, which were discovered May 7. In the meantime, Microsoft is advising administrators to delete the three files, which were never intended for production servers.

Where's Wahl?

Paul Wahl, who joined security start-up TriStrata Security eight months ago as president and CEO after stepping down as head of SAP America, has bailed out again. This time, Wahl has left to become president and CEO of customer-management software vendor Siebel Systems. TriStrata's senior vice president of worldwide sales, Ken Coulter, will take over the position vacated by Wahl.

Executive Paul Wahl is on the move again.

More woes for Lotus CEO

Lotus CEO Jeff Papows may have exaggerated his military exploits, as *The Wall Street Journal* reported April 29, but there can be no denying he's under heavy fire. Hard on the heels of that story, which also alleged that Papows fudged his educational and family histories, comes news that the hard-charging head of the IBM subsidiary is the subject of a sexual harassment complaint. According to the complaint filed by former Lotus Executive Arlene Greene with the Massachusetts Commission Against Discrimination, Papows has conducted a "long-term intimate relationship" with his assistant, Sharon Ricci, who in turn "collaborated" with him to undermine the careers of other female executives.

While Papows has not been granting interviews, a statement from Lotus to the *Journal* said the complaint is "without merit and contains reckless and unfounded allegations." IBM remains mum.

IBM Netfinity servers will get a new look

BY MARC SONGINI

SANTA CLARA, CALIF. — IBM is readying a host of changes to its Netfinity PC servers that will greatly boost the ability of the machines to handle large applications and keep pace with high-speed network traffic.

One key change will be IBM's move away from a shared-bus architecture to a switched-fabric based on the emerging Future I/O technology, company officials said last week. The company will have a public meeting next week with its Future I/O partners 3Com, Compaq, Hewlett-Packard and other companies, and will release further specifications for Future I/O technology. Proponents of Future I/O say the technology should start appearing in products by the end of next year.

IBM also is looking into new ways of clustering Netfinity servers with each other and with higher end IBM machines, such as RS/6000s and AS/400s.

But moving from a shared-bus to switched-fabric architecture is the biggest change on tap for IBM's servers. IBM wants to ensure the servers can handle 64-bit programs and not become bottlenecks in new Fibre Channel and Gigabit Ethernet networks.

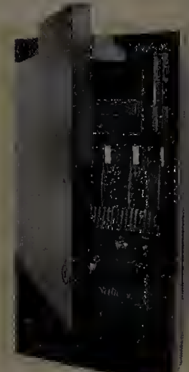
Future I/O technology will enable Netfinity servers to handle up to 40 adapter cards before performance degrades, says Tom Bradicich, a director of server architecture at IBM. Future I/O fits into a broad IBM effort to bring technologies used in higher end IBM machines down to Netfinity's level.

IBM and other companies are also working on PCI-X, a bus architecture that will function as an interim solution to speed up server buses from 128M byte/sec to 1G byte/sec. It should be included in products by year-end.

In addition to PCI-X and Future I/O, IBM has a number of other efforts underway to bolster its PC servers.

The company is considering applying an I/O-enhancement technique called RIO that it's beginning to implement on its high-end RS/6000 servers. RIO, or remote I/O, would involve splitting Netfinity machines into two parts: one that contains CPUs and another that includes I/O slots. The two parts could then be connected by wires stretching up to 15 meters and ports could be added to the I/O half of the system without straining the CPU half.

IBM also is considering using its high-speed Fibre Channel connection technology to cluster RS/6000s and AS/400s with Netfinity servers. Bradicich says IBM has not determined when it will release this technology for the Netfinity. ◪



New look for Netfinity

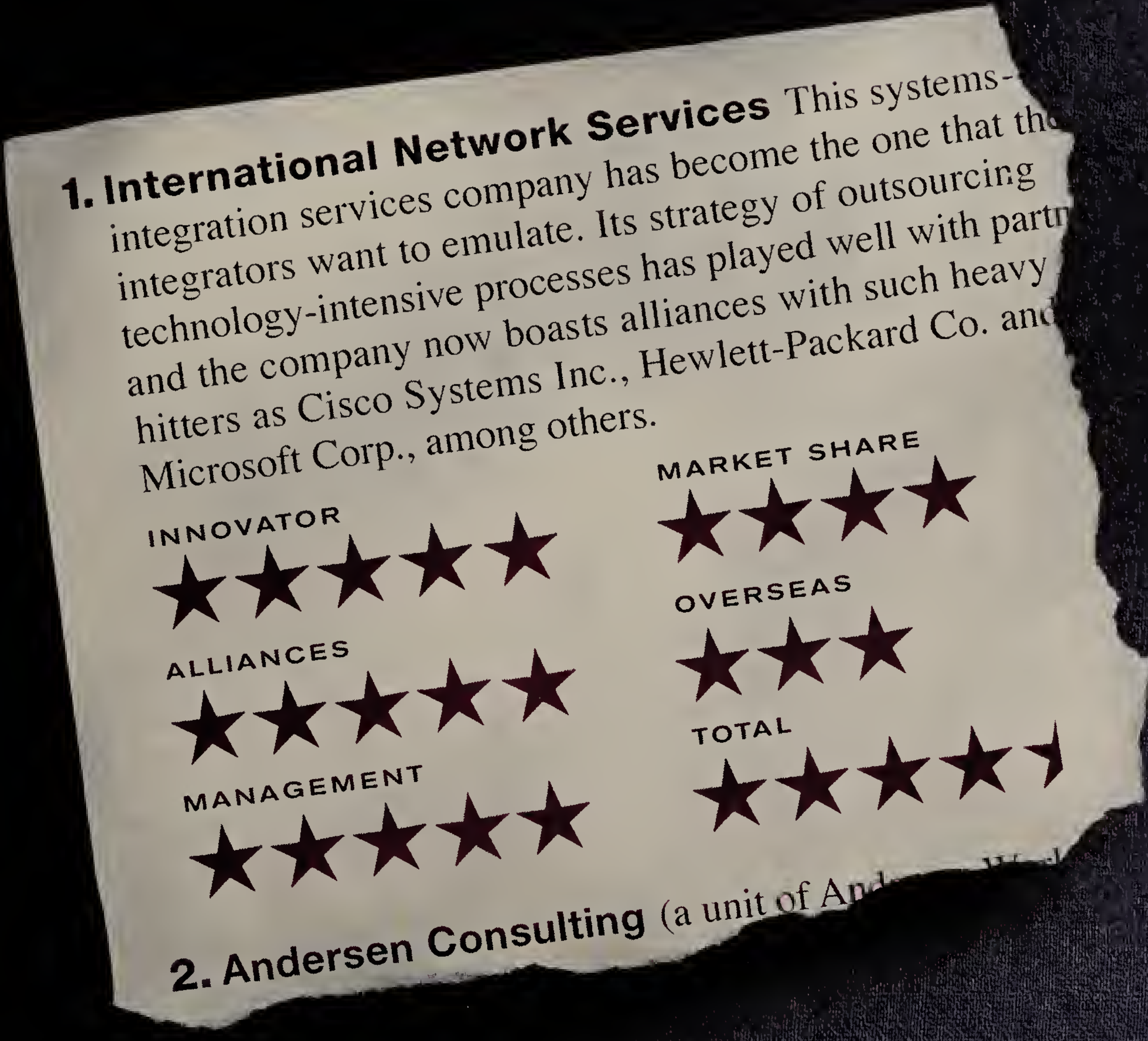
IBM is plotting these changes to its PC servers:

- A switched internal fabric to replace the shared bus
- Fibre Channel connections to RS/6000s, AS/400s and storage devices
- Increased I/O capacity by divvying up I/O slots and CPUs into separate boxes

Clarification

In the April 26 issue of *Network World*, "Inktomi caches on," the Web caching research referenced by Greg Howard of the High-tech Resource Consulting Group in San Jose, was conducted while Howard was employed by Infonetics Research, Inc. of San Jose.

INS.
Now with more network stars than anyone.



1. International Network Services This systems-integration services company has become the one that th integrators want to emulate. Its strategy of outsourcing technology-intensive processes has played well with part and the company now boasts alliances with such heavy hitters as Cisco Systems Inc., Hewlett-Packard Co. an Microsoft Corp., among others.

INNOVATOR ★★★★★	MARKET SHARE ★★★★
ALLIANCES ★★★★★	OVERSEAS ★★★
MANAGEMENT ★★★★★	TOTAL ★★★★

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NOS vendors battle it out

BY CHRISTINE BURNS AND SANDRA GITTLEN

LAS VEGAS — A love fest it wasn't.

Executives from leading operating system vendors Novell, Microsoft, Sun, Red Hat and The Santa Cruz Operation (SCO) engaged in a sometimes feisty debate about the future of their respective products in front of almost 400 NetWorld+Interop 99 attendees last week at *Network World's* Operating Systems Showdown.

The group did agree on one theme: Find a NOS niche and nail it. But after that, company executives conceded little else to each other.

Perhaps fittingly, operating system giant Microsoft opened the sparring session with the unpopular assertion that a single operating system — Windows 2000 Server — can be general-purpose enough to be an enterprise NOS, an application server and a development environment.

That claim didn't sit well with the other vendors or the panel of experts, which included International Data Corp. Vice President Rick Villars.

Fellow operating system vendor executives were only too happy to pepper Windows 2000 marketing chief Jim Ewel with questions about Windows 2000's delivery delays and reliability and the anticipated administrative hassles that could be associated with deploying Windows 2000's 40 million lines of code.

On the subject of reliability, Novell Chief Scientist Drew Major asked Ewel how many service packs Microsoft would have to release before Windows 2000 could be considered stable.

"It will be stable when it ships," Ewel snapped.

Then Major asked if Microsoft was committed to shipping the server version of Windows 2000 by year-end.

Looking for a little wiggle room, Ewel said: "We are not so much committed to a date, as to a level of quality."

Sun Solaris executive Brian Croll asked Ewel if Microsoft would be willing to license the source code of Windows 2000 network components to all of the competitors standing on stage with him. Ewel answered: "I'm not sure why licensing code is necessary for interoperability. Windows 2000 is built on standards. That should be enough."

Taking the target off Microsoft, Novell's Major said his company will be pushing its flagship NetWare NOS as the best platform for supporting specialized server appliances such as caching, directory and storage-area network servers.

When asked if this move toward specialization meant that Novell was giving up on the application server market, Major said Novell would continue to fight that battle by delivering server-side Java support. If the market for server-side Java applications fails to materialize, "there is no Plan B," Major said.

Sun's Croll tried to get Major to tag team with him against Microsoft when he tossed this question in Novell's direction: "How important is Java compatibility across servers?" Croll was alluding to Microsoft's efforts to promote its own Java API set.

"Nobody wants the Balkanization in Java that there is in the Unix world," Major said.

On another hot topic, Sun's Croll pointed to published benchmarks he claimed proved that none of Sun's competitors could outshine the Solaris/SPARC combination for supporting high-end, mission-critical Web and database applications.

SCO's Tamar Newberger, director of server product marketing, wasn't fazed by Croll's claim: "But why do you keep selling SPARC when Intel is the clear chip winner?" she asked.

Newberger fired some other pointed barbs at her rivals. At one point she labeled SCO's competitors as "NetWare, beware, shelfware and nowhere," referring to the offerings of Novell, Microsoft, Red Hat and Sun, respectively.

Newberger repeatedly noted UnixWare's 80% chunk of the Unix/Intel market as evidence that SCO was ready to break out of its traditional small to mid-size business markets and make a mark in the enterprise network arena with new, more scalable renditions of UnixWare.

While Sun and SCO executives touted their operating systems' scalability, Red Hat ducked questions about Linux's inability to support thousands of users.

Red Hat's top engineer, Erik Troan, was frank in his admission that the Linux 2.0 kernel "was not very scalable." But he said pending benchmark tests of the Linux 2.2 kernel running on eight-way SMP boxes that will be published in the next three to four months will surprise Red Hat's competitors. "Or maybe they will be disappointed," said Troan, implying that these tests would show Linux could outperform competing operating systems.

Troan argued that only open source Linux could help customers avoid "vendor lock-in." ◪

NetworkWorld SHOWDOWN Operating Systems

NOS vendors go to the mat

"Is Windows 2000 the software project from hell?"

Brian Croll, Sun

"Customers don't buy operating systems, they buy applications, and we've done more work in that area than anyone else here."

Jim Ewel, Microsoft

"NetWare, beware, shelfware and nowhere."

Tamar Newberger, SCO, referring to offerings from Novell, Microsoft, Red Hat and Sun

"How long can Sun afford to continue to fight the chip, server [operating system] and Java battles simultaneously?"

Drew Major, Novell

"Why isn't the 17 million user base for Linux big enough for Microsoft to port Office 2000 to?"

Erik Troan, Red Hat

DAVID WAITE

Intel snaps up company in stealth deal

BY DENI CONNOR

SANTA CLARA, CALIF. — Intel has quietly taken over XLNT, a maker of Gigabit Ethernet switches, in a move that resulted from an Intel equity investment gone sour.

According to Intel officials, the chip maker decided that rather than sink more money into XLNT, it made more sense to buy the privately held company and turn it into a product design center. Intel, which did not publicly announce the acquisition when it took place last month, declined to reveal terms of the buyout.

XLNT, based in San Diego, attempted to separate itself from the Gigabit Ethernet pack by emphasizing its ability to help customers migrate to Gigabit Ethernet from older networks, particularly those based on FDDI.

But XLNT never really made itself heard above the noise generated by well-heeled start-ups such as Extreme Networks and Foundry Networks, and well-established vendors such as Cisco.

XLNT's top-of-the-line switch, the Millennium 4000, boasts 36 Gigabit Ethernet ports as well as a mix of ATM, 10/100M bit/sec Ethernet and FDDI interfaces.

Intel plans to relabel XLNT's modular switches under the Intel name. The switches will be Intel's high-end offerings for its small and mid-size corporate network customers.

Intel has made a series of acquisitions over the past couple of years to boost its presence in the internetwork equipment market. Earlier this year, Intel added Gigabit Ethernet technology to its portfolio via the acquisition of Level One Communications.

Intel offers a variety of internetwork gear, from network adapter cards to switches and remote access routers. ◪

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The Computer Inside.™

UUNET is dressing up its VPN offerings

BY DENISE PAPPALARDO

LAS VEGAS — UUNET last week beefed up its virtual private network (VPN) offerings with the introduction of a new managed global service that offers strong security and networkwide service-level guarantees.

UUsecure, introduced at NetWorld+Interop 99 last week, will support the Internet Engineering Task Force's Internet Security (IPSec) protocol when the service is available in June, and class-based queuing (CBQ) by the fourth quarter.

The company's existing VPN services, which UUNET inherited through parent company MCI WorldCom's many acquisitions, include WorldVPN and the Virtual Private Data Network (VPDN). Neither of these services, which are based on different firewall technologies, is as robust as UUsecure because the offerings do not support IPSec or bandwidth management features.

UUsecure will be a fully managed offering based on Xedia's AccessPoint QVPN routers deployed at each site on a customer's VPN. All of UUNET's UUsecure VPN customer networks will be managed and monitored from the ISP's Global VPN Network Operations Center in Ann Arbor, Mich.

UUNET engineers in the network operations center will use Xedia's new QVPN Builder policy manager to establish VPN requirements, such as approved user lists and the level of encryption that should be supported.

QVPN Builder will also allow UUNET to make adds, drops or changes remotely to the AccessPoint QVPN routers.

UUNET isn't the first ISP to deploy Xedia's QVPN product line. Concentric Networks announced its ConcentricQoS VPN service earlier this month (*NW*, May 3, page 6).

ConcentricQoS also supports IPSec-compliant encryption and CBQ, features that let business users set up various priority queues for IP traffic based on application type, IP address or URLs. The CBQ feature will be available when Concentric rolls out the service next month. UUsecure users will have to wait until at least October for that same feature.

But UUNET's service will have the advantage of global reach. UUsecure will be available in 14 countries by year-end, says Ralph Montfort, product marketing manager at UUNET. Some of the first countries to get the service after the U.S. will be Germany and Canada, where UUNET is already testing the service, he says.

The service also comes with standard service-level agreements (SLA) that guarantee 99.9% network availability from site to site for 10 or more sites. And for users supporting fewer than nine sites, the network availability guarantee is 99.8%. UUNET is also guaranteeing that average round-trip latency will not exceed 120 msec between VPN sites.

The company is backing up its claims with 15% to 30% service credits if it does not live up to its guarantees in a given month.

UUNET's SLA is one of the primary reasons J.D. Edwards & Co. is rolling out a UUsecure VPN pilot, says Dan Lacinski, director of network services at the Denver software manufacturer. "UUNET has a measurable and meaningful SLA that will allow me to hold it to its guarantees," Lacinski says. "I'm getting close to and in some cases exceeding my existing frame relay SLAs."

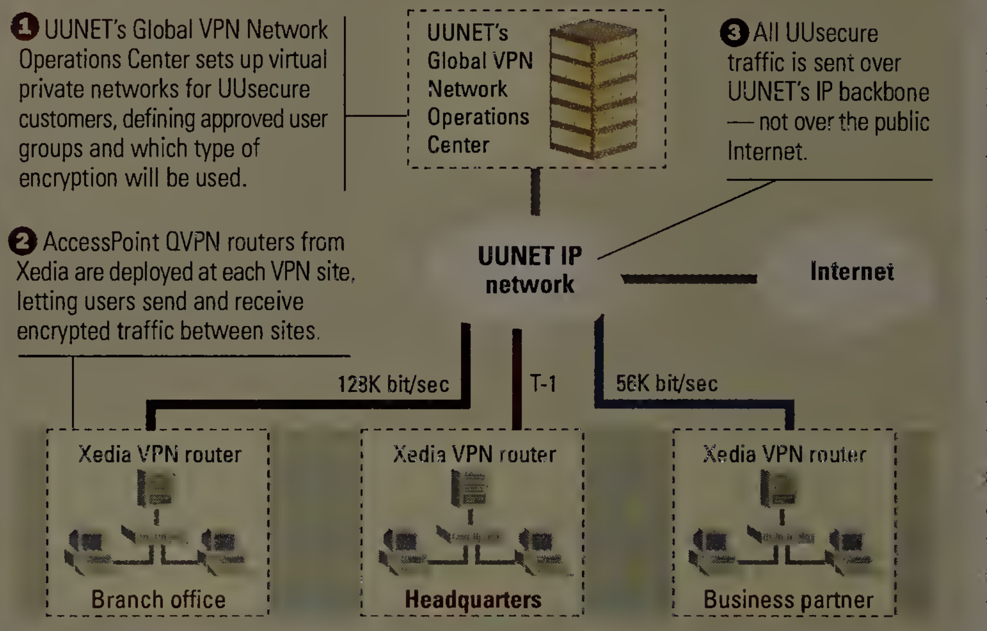
If the pilot is successful, J.D. Edwards may set up a 20- to 100-site UUsecure VPN, Lacinski says.

In announcing its UUsecure service, UUNET also stated it is trimming its VPN product line. The ISP is no longer selling its ExtraLink, ExtraLink Remote or SafeReach IP products because of product overlap, Montfort says. UUNET and MCI WorldCom Advanced Networks merged earlier this year.

UUsecure is slated for availability in June for $595 per month per 56K bit/sec connection, $1,895 per month per 1.544M bit/sec T-1 connection and $35,000 per month per 45M bit/sec connection.

UUNET: (703) 206-2600

How the UUsecure VPN service works



❶ UUNET's Global VPN Network Operations Center sets up virtual private networks for UUsecure customers, defining approved user groups and which type of encryption will be used.

❷ AccessPoint QVPN routers from Xedia are deployed at each VPN site, letting users send and receive encrypted traffic between sites.

❸ All UUsecure traffic is sent over UUNET's IP backbone — not over the public Internet.

Reporter's Notebook

NETWORLD+INTEROP 99, LAS VEGAS

If you could stand the cab lines, keep yourself from sweating through your suit in the 90-degree heat and live through the endless prattlings of marketing folks and their PowerPoint presentations, some fun stuff actually went on at the show last week. Here is our compendium of some of the weird, or at least mildly amusing, events:

Vendor learns how to feed demand

Equant Network Services, an international frame relay/ATM and IP carrier, knows from experience that Interop attendees are not only hungry for seamless broadband services, but just plain hungry. Visitors to Equant's booth got a little box of cereal with the legend, "The world is waking up to Equant, global network of champions." Equant officials considered that an improvement over last year's show when they introduced their Integrated Voice and Data service with an orange juice container reading "Freshly squeezed voice and data." Problem: The container had no juice, and people complained, says Laurence Huntley, Equant executive vice president. "So this time we gave them something in the box," he says.

DAVID WAITE

Shagging, VPN style

At times the show felt more like a Hollywood movie preview than Interop. With *Star Wars'* Princess Leia in one booth and Austin Powers in another, attendees were treated to a sneak peak of the upcoming summer sequels to their favorite movies, network style. TimeStep's shaggadelic Powers takeoff called "Awesome Powers" had scores of gawkers crowding in to watch an episode with the Mad Hacker. Powers had one message for prospective customers: "VPNs are groovy baby." Who knew?

Alien Part Deux

FujiFilm was quite the hit this year, but not just because of its new line of storage products. Despite the fact the company's booth was located in the far caverns of the convention center, a large and steady crowd of attendees made the trip not because of technology, but graft: a blow-up alien squeaky toy. The dolls were a hit at the fall Interop, but many people thought the dolls' expressionless faces were too creepy. This time, they had smiles on their kissers.

Is it ION, or is it Memorex?

During his keynote address, Sprint CEO William Esrey treated attendees to a demonstration of Sprint's Integrated On-Demand Network (ION) voice/data service from a small office or residential set-up with a colleague in Kansas City. Esrey cautioned that the small-office version of ION is still being tested and that the integrated-access device used at the Kansas City location was a prototype. But he boasted that the calls and data connections were running live over ION. Well, sort of. Sprint officials later admitted that the box involved was a FORE ATM switch — not exactly the kind of gear you'd ordinarily install at home — feeding traffic over a dedicated permanent virtual circuit to Las Vegas on Sprint's ATM network. Meanwhile, Sprint and partners Cisco and Telcordia (formerly Bellcore) are still developing a $200 to $300 hub suitable for those installations.

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Novell branches out with NDS

BY ROBIN SCHREIER HOHMAN

LAS VEGAS — Novell last week announced several new products and partnerships designed to give its directory technology a bigger role in branch offices, corporate telephone networks and IBM host environments.

The company used NetWorld+Interop 99 to introduce BranchManager for NT, an application suite for managing remote-office networks running Windows NT servers.

BranchManager for NT contains four components: NDS for NT 2.01, an IP version of Novell Directory Services (NDS); ZENworks 1.1, a software distribution tool; ManageWise Agent for Windows 2.6, a network monitoring tool; and BorderManager Authentication Services 3.0, a remote authentication tool.

The suite is available now and costs around $10,000 for one NT server and a five-client license. Additional licenses are available in 5-, 10- and 25-client packs for about $50 per client.

More work with Lucent

Novell also revealed that it is working with Lucent to develop an NDS-based management console for Lucent's Definity PBXs.

The console will enable companies to make changes to employees' phone numbers and have those changes automatically reflected across an NDS directory containing other user information.

Novell marketing executive Michael Simpson says that many moves, adds and changes begin with the phone system, so linking NDS with Definity PBXs is a natural extension of Novell's directory technology.

This is the second joint development venture between Novell and Lucent. Lucent is getting set to ship an NDS management console for its Cajun P550 Gigabit Ethernet switch. The console will enable companies to set network access policies based on identity rather than IP address.

"Being able to set policies on switches through NDS at a user, group or container level has been a dream of mine for quite some time," says Jeff Owens, a network administrator at the S&P Company in Vancouver, Wash. Owens says he's considering buying Cajun P550 switches because of the NDS link.

Links with IBM

Also last week, Novell announced plans to deliver an application suite in conjunction with IBM.

The Novell Host Integration Solution will feature tools for connecting to IBM mainframes and AS/400s via the Web.

The suite, set to ship in June, will include the following: NetWare for SAA, which connects NetWare and IBM networks and employs NDS; NetWare Host Publisher 1.1, which allows users to access host-based data; IBM Personal Communications 4.3, a terminal emulator; and IBM Host On-Demand 3.0, a Java emulator that allows browser access to the host. ◪

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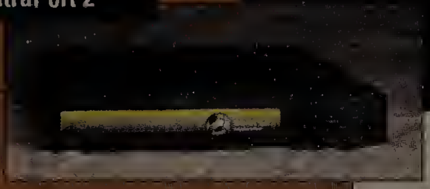

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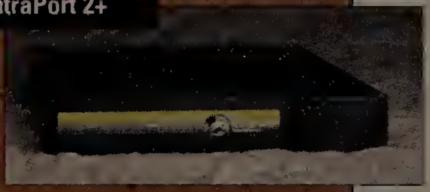

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ASPs making noise at N+I

BY DENISE PAPPALARDO

LAS VEGAS — "Application Service Provider" (ASP) may have been the most widely used buzzword at last week's NetWorld+Interop 99 with new service announcements from a handful of providers and the creation of the ASP Industry Consortium.

Qwest, Conxion, US WEST and Sprint all announced new application-hosting services and plans last week. At the same time, 25 other vendors and service providers created the ASP Industry Consortium, which plans to develop common ASP definitions, sponsor research, and educate users and vendors.

The consortium consists of some industry heavyweights, including AT&T, Cisco, Sun and MCI WorldCom's UUNET. The group is still forming its business plan, but Chairman Traver Gruen-Kennedy, director of advanced business at Citrix, says committees will be set up by fall to conduct market research studies and adopt technical and architectural "best practices."

As for ASP service announcements at the show:

- Qwest says it will offer SAP America's financial and human resources applications to customers via the Internet from a series of centers outfitted with Hewlett-Packard servers. HP is investing $500 million worth of hardware, software and support in exchange for a portion of the service's monthly revenue.
- Conxion, a San Francisco ISP, is rolling out a new service for the medical industry that will let users access Object Products' health care software over the 'Net.
- US WEST is reselling USinternetworking's electronic commerce application-hosting services, which are based on software products from BroadVision and Microsoft. USinternetworking also offers financial, human resources and sales application-hosting services.
- Sprint announced plans to support other ASPs. The company already offers its own hosted-application services, such as Internet Conference Center and Sprint eCommerce. But, like UUNET, Sprint sees its role as a network and infrastructure provider for ASPs that want to collocate servers at a Sprint data center.

The idea for these and other players is to host and manage applications and sell access to them to users. The concept is hardly new — it was tried without success in the early '90s by the likes of AT&T, Novell and MCI. But recent services focusing on areas such as e-commerce Web sites and e-mail have met with more success, fueling the current buzz.

This is only the beginning, says Daniel Briere, president of TeleChoice, a Boston consulting firm. Whereas the focus today is on high-end applications like those from SAP that are tough to deploy and require a lot of support, Briere says it won't be long before ASPs will offer standard applications such as Microsoft Office.

It has yet to be proven that users will save money by choosing an ASP instead of buying and deploying applications themselves. Some initial prices look high, with USinternetworking's prices ranging from $10,000 to $200,000 per month depending on the application and number of users.

But by signing on with an ASP, Briere says users get a level of support that many can't offer in-house, such as 24-7 management and monitoring, along with stronger security. ◪

Join the club

The Application Service Provider Industry Consortium was launched last week at Interop to develop best practices for hosting applications online. Founding members include:

- AT&T
- AristaSoft
- Boundless Technologies
- Cisco
- Citrix Systems
- Compaq
- CyLex Systems
- Ernst & Young
- Exodus Communications
- FutureLink
- GTE
- Great Plains Software
- IBM
- Interpath Communications
- JAWS Technologies
- Marimba
- Onyx Software
- SaskTel
- Sharp Electronics
- Sun
- The Taylor Group
- Telecomputing
- UUNET
- Verio
- Wyse Technologies

Extreme, Xylan preview switch advances

Performance Technologies shows off fault-tolerant switch.

BY JEFF CARUSO

LAS VEGAS — Several vendors last week offered sneak peeks at emerging technologies and the next generations of their LAN switches at NetWorld+Interop 99.

Among those with a lot to show was Extreme Networks, which previewed an upcoming 10/100/1000M bit/sec auto-sensing switch and demonstrated wave division multiplexing (WDM) technology.

Extreme also was one of several vendors showcasing Gigabit Ethernet over copper with technology fresh from its labs. Extreme ran Gigabit Ethernet over copper from one switch to another, as did Hewlett-Packard with its ProCurve switches. Alteon WebSystems and Packet Engines demonstrated the technology on network interface cards.

The copper version should help reduce the prices of Gigabit Ethernet equipment, says David Passmore, research director of NetReference. "The cost of production for Gigabit Ethernet over copper is about the same as Fast Ethernet," he points out.

Extreme also had in its booth a 32-port switch that will eventually be able to automatically detect the speed of an Ethernet connection over copper and adjust accordingly, says George Prodan, vice president of marketing at Extreme. The product will work for all Ethernet speeds and will likely be out by year-end, he says.

Extreme also demonstrated WDM on its BlackDiamond chassis switch. Four full-duplex Gigabit Ethernet inputs on one card were multiplexed onto one multimode fiber-optic line on a second card. Extreme says the line can reach about 220 meters.

Xylan's Steve Kim plans on giving Cisco some competition.

Separately, Xylan says it will soon unveil the OmniAccess switch, a device that can send voice or fax calls over frame relay, ISDN or a virtual private network.

OmniAccess is intended as competition to the Cisco 2500 branch-office router, says Steve Kim, president and CEO of Xylan. Kim says Xylan was developing the product before being acquired by Alcatel.

Xylan expects to ship the product in the third quarter.

Also at the show, Performance Technologies displayed a Fast Ethernet switch with fault-tolerant capabilities. The Nebula 8000 has two switching fabrics, one of which backs up the other. The switch has 32 ports of Fast Ethernet and will cost $24,000. The product is expected to ship this summer.

Extreme: (888) 257-3000; Xylan: (818) 880-3500; Performance Technologies: (716) 256-0200

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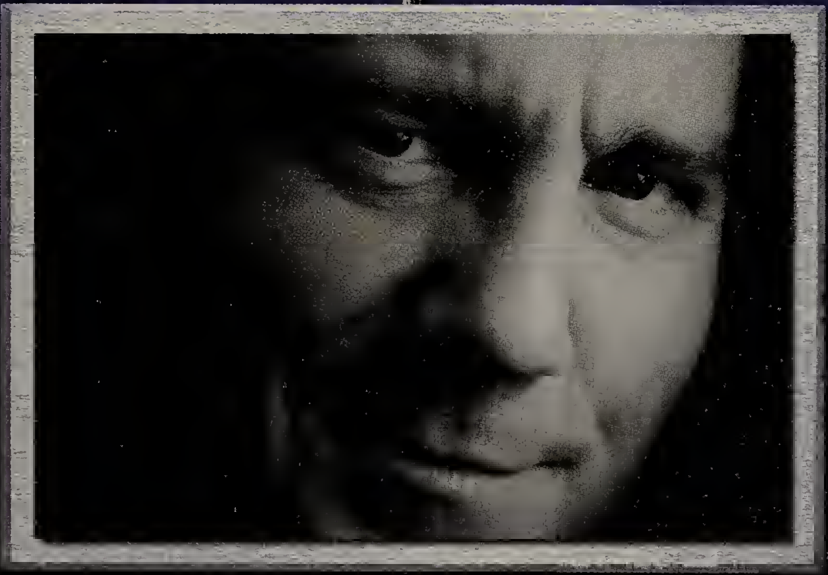

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Interop,
continued from page 1

(NDIS)-complaint NIC, including those from rival Intel.

3Com is offering its software to users of rival NICs to "overcome objections from customers with non-3Com NICs," says Stephen Philip, director of marketing in 3Com's PC business unit.

3Com also demonstrated a wave division multiplexing (WDM) module for its Core-Builder 9000 switch that will allow users to build optical campus nets. WDM sends traffic over fiber lines using laser lightstreams.

3Com's module supports 8G bit/sec of aggregate bandwidth and a single-mode fiber connection up to 35 kilometers. 3Com did not say when the module will ship or how much it will cost.

At Cisco's booth, the company demonstrated a new version of its QoS Policy Manager that supports the Common Open Policy Server (COPS) protocol, an emerging standard for disseminating policy data from servers to network devices. COPS will be included in QoS Policy Manager 2.0, which will also include tighter directory integration that will let network executives more easily parse QoS according to user needs.

Also showing leading technology were Hewlett-Packard, Alteon and Extreme Networks with hastily assembled NICs for running Gigabit Ethernet over copper. Broadcom chips fresh from the factory were rushed to HP and Alteon and soldered onto waiting boards just in time to reach the show. Extreme would not say whose chips it used.

PHOTOS: DAVID WAITE

The booths at NetWorld+Interop 99 served up a mix hot network technologies and a lot of entertainment.

Meanwhile, Cisco and Nortel Networks software engineers wrote code so their companies' routers in the show's demonstration lab could interoperate using Multi-protocol Label Switching (MPLS), a proposed standard to speed IP packets through routed networks. The demonstration employed Label Distribution Protocol (LDP), the shorthand by which routers swiftly read, relabel and pass labeled packets along a predetermined path through a network, reducing routing delay.

In another InteropNet Labs demonstration, Nortel wheeled out a prototype switch that powers IP phones in a network. Rather than requiring a separate electrical connection to a wall socket, the phones got power from a port on a Nortel Baystack 350 switch. As long as the network has power, so do the phones.

Also at InteropNet Labs, virtual private network (VPN) vendors, including Internet Dynamics, Radguard and TimeStep, demonstrated interoperability between their products using the IP Security standard for authenticating and encrypting IP packets. The vendors attempted to establish security associations with each of the other vendors' VPN equipment, then pass data across the secure tunnel.

Vendors had to scramble to succeed. Internet Dynamics, for example, which could not establish secure links with any of the other vendors' gear during a dry run of the test 10 days before the show, wound up successfully doing so with all 11 other vendors' products by showtime.

At Sprint, the company again touted its leading-edge ION network.

Last week, Chairman William Esrey demonstrated some combined voice and data applications for ION at small-business and residential locations. After the demonstration he held a press conference in which he acknowledged that the service — which aggregates voice, video and data through a single access device and local access line — is still evolving.

Esrey revealed in his keynote that Sprint plans to sell a software package called ION Desktop Manager, which will let users manage multiple phone calls plus data and video sessions from a single-client desktop.

The tone of Esrey's remarks was different from a year ago, when he announced ION at a Broadway theater and said only Sprint had the capability to provide such a converged service. For example, Esrey said AT&T's strategy of reaching residential locations via cable lines is a "viable strategy." But he added "I do question the amount of money they're spending to put all this together."

On another matter, Esrey acknowledged that Sprint's partnerships for global, wireless and integrated-access services have not been problem-free. Many have been marked by internal disagreements.

Sprint and other companies are pressing hard to become one-stop shops for application hosting and net connections. As a result, Esrey said in his keynote, "The traditional duties of the network manager will go the way of the keypunch operator. The network manager will worry about data, not routers. IS will not be a call center, but rather a business unit." ◪

Cabletron looks beyond enterprise networks

BY JIM DUFFY

LAS VEGAS — Cabletron Systems is set to extend beyond the boundaries of enterprise networks and into the service provider market, with an ambitious virtual private network (VPN) and voice-over-IP product launch.

Within the next four weeks, Cabletron will announce a raft of offerings targeted at service providers delivering VPN and converged voice and data services to enterprise users. Cabletron demonstrated many of the new products here last week at NetWorld+Interop 99.

They include three new SmartSwitch Routers and two new WAN modules for the routers, as well as a voice-over-IP gateway developed by Hypercom and resold by Cabletron under an OEM arrangement. Cabletron is also expected to unveil Spectrum applications for managing service provider networks and voice equipment.

The product launch is critically important for Cabletron, given that the company's core enterprise network equipment market has slowed down. Cabletron must sell more gear to service providers to offset the shortfall, drive future growth and stay competitive with rivals Cisco, Nortel and 3Com.

Indeed, Cabletron's recent financial turbulence has been blamed in part on the company not having a sales strategy or product line for service providers. Cabletron has even criticized Cisco for "abandoning" the enterprise market in favor of service providers, even though Cisco's growth and market capitalization are testaments that Cisco's strategy is a wise one.

Now, Cabletron has apparently seen the light. Over the past six to nine months, the company has invested a third of its R&D capital and human resources on this launch, says Michael Skubisz, Cabletron's chief technology officer.

"Our biggest challenge is credibility," Skubisz says. "We're looking to penetrate the market from places closest to our home turf," he adds, referring to service providers that target enterprises rather than those that specialize in sales to consumers.

Cabletron's new SmartSwitch routers will boast a mix of LAN and WAN interfaces, including 10/100M Ethernet, T-1/E-1 and ISDN. The routers will support Data Encryption Standard (DES) and 3DES encryption, as well as compression and IP tunneling. The new SmartSwitch WAN modules support packet-over-SONET and ATM.

The voice-over-IP gateway will provide voice- and fax-over-IP services, and assign quality of service based on Layer 4 port and socket number information. The SmartVoice Gateway scales up to 96 T-1s.

The Spectrum applications will enable service providers to monitor service levels, network design and network accounting, and provision services based on policies. The applications will also enable management of PBXs and central office switches. ◪

Be a

Net Know-It-All

For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2467 in the DocFinder box.

This week's question:

The Desktop Management Task Force has slightly changed its name. What's the group's new name?

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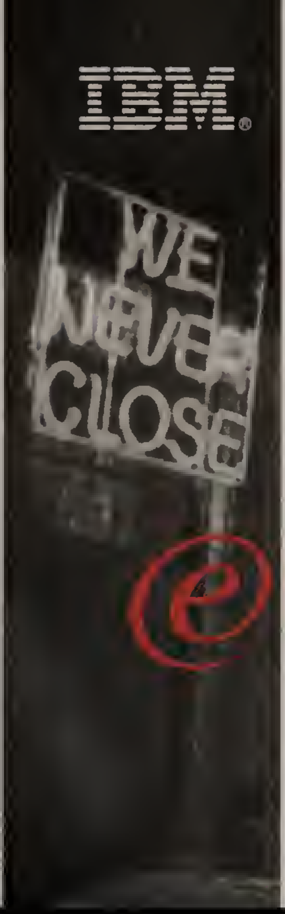

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Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

Compaq has introduced its lowest-priced AlphaServer, a single-processor machine designed to be dedicated to a specific application, such as e-mail.

The DS10, which runs Tru64 Unix or Linux, comes with up to 2G bytes of memory and 29G bytes of disk space. It stands just over five inches high and is rack-mountable.

Compaq's DS10 runs Tru64 Unix or Linux.

The DS10 contains four PCI slots, two 10/100M bit/sec Ethernet adapters, a CD-ROM drive and a tape drive. DS10s can be clustered using Compaq's TruCluster software.

Pricing for a DS10 with 64M bytes of memory and 10G bytes of storage starts at $3,500.

Compaq: (281) 370-0670

Sync Research has introduced FrameNode 3700, a branch office router that links Ethernet or token-ring LANs to the WAN.

The router has either an Ethernet or a token-ring port and up to four serial interfaces for SNA or other devices.

The product has a 56/64K bit/sec DSU/CSU for linking to a frame relay network, but it also comes with an ISDN terminal adapter or 56K bit/sec modem for backing up the frame relay connection. The box can be managed remotely via a dial-up port.

FrameNode 3700 is available now, with pricing starting at about $3,100.

Sync: (949) 588-2070

Are megarouters coming to your net?

Internet router start-ups see applicability of their products in campus networks.

BY JEFF CARUSO AND JIM DUFFY

It may not be long before enterprises will require the power of gigabit and terabit routers now targeted for the Internet.

In the next 12 to 18 months, enterprises will have enough traffic on their networks to mandate the speed, port density and quality-of-service capabilities of the Internet super routers, claim officials from several router start-ups. In addition, officials say technologies for increasing fiber capacity, such as dense wave division multiplexing (DWDM), will be inexpensive enough to deploy in the enterprise.

"The big campuses are starting to deploy the DWDM gear at enterprise levels," says Mukesh Chatter, CEO and president of Nexabit Networks in Marlborough, Mass. "As they deploy DWDM, it becomes critical that they feed it with something that has high-density OC-48 [2.4G bit/sec] or OC-192 [10G bit/sec] connections."

"As we start delivering inexpensive wavelengths to enterprises, each wavelength could be OC-48 or OC-192," says Ash Dahod, president of NetCore Systems of Wilmington, Mass.

Enterprises typically don't exceed 1G bit/sec in the LAN or T-3 in the WAN. But growing corporate use of the Web and the Internet, coupled with a desire to converge voice and video onto data networks, is driving the need for more bandwidth, more ports and higher-performance devices that can discriminate between a CEO's companywide videoconference and a solitary employee's use of PointCast.

> ***"High bandwidth is going to become a commodity."***
>
> Ash Dahod, president, NetCore Systems

Such bandwidth requirements may now be isolated to only the biggest enterprises. Nexabit's current marketing efforts are focused squarely on service providers, though Chatter says two of the top 50 Fortune 500 companies have approached Nexabit inquiring about the company's NX64000 terabit switch/router.

While this amount of enterprise customer interest doesn't exactly represent a ground swell, Chatter is confident that interest will grow as bandwidth usage

See **Megarouters**, page 20

Network Engines serves up Linux for clustering

Compact servers can be linked into clusters of about 250 boxes to balance traffic loads.

BY DENI CONNOR

LAS VEGAS — Network Engines last week unveiled a compact Linux server designed to be clustered and host big Web sites for large corporations and ISPs.

The company's X-Engine server, unveiled at NetWorld+Interop 99, is powered by one or two Pentium II or III processors and runs Red Hat Linux. The 2-year-old Randolph, Mass., company already sells a similar Windows NT machine called WebEngine.

Companies can link up to about 250 of the new X-Engines in a cluster, and the machines can balance traffic loads across the cluster and take over for downed servers. Servers can be added to or removed from a cluster without taking down the network.

The X-Engine is rack-mountable and stands 1.75 inches high, allowing up to 40 servers to fit in a standard rack.

Few vendors have such compact or fault-tolerant servers, says Kimball Brown, an analyst with Dataquest in San Jose. "The clustering software Network Engines developed allows Windows NT or Linux to have incredible scalability," he says.

X-Engine competes with products such as Cobalt Micro's RaQ 2, 80 of which can be mounted in a rack.

Navisite, which is already using Network Engines' NT servers, is considering using the Linux boxes as well.

"You can easily get up to 40 servers in a rack where space is limited," says Mike Lough, principal development engineer at Navisite, an Andover, Mass., company that hosts Web sites for customers on individual servers. "If we need another server, we can just buy one and cluster it in."

X-Engine comes bundled with two software packages, ClusterBalance and ClusterDirector, which automate load balancing, server monitoring and troubleshooting. From a Web browser, users can reset servers, change the boot sequence or update the operating system without adversely affecting operations.

X-Engine will be available in the second quarter, with pricing starting at $5,300.

Network Engines: (781) 961-4400

The X-Engine files

Network Engines' new X-Engine server highlights:

- Powered by one or two Pentium II or III processors
- Up to about 250 boxes can be clustered
- Bundled with Red Hat Linux
- Up to 40 boxes can be stacked in a rack
- Pricing starts at $5,300

NTP Software clamps controls on NT, Exchange

New tools to help network administrators manage e-mail subscription services and disk quotas.

BY JOHN FONTANA

NTP Software this week will provide Windows NT network administrators with new tools for managing e-mail subscription services and disk quotas.

Among the new tools is List Manager 6.0, which lets Exchange Server support e-mail list services. List services provide a way to distribute information in bulk via e-mail to list subscribers whether the subscribers are inside or outside of a company.

Hosting list services has traditionally been the sole domain of Unix servers.

NTP also will preview Version 5.0 of its disk quota tool.

Both tools are designed to expand the capabilities of NT and Exchange Server and are being tested with Windows 2000 Beta 3.

Administrative assistants

NTP Software this week will unveil List Manager 6.0, a tool for managing and administering e-mail lists in Exchange Server. Also, NTP will preview the next version of Quota Manager, the company's disk quota tool for NT.

Product	New features	Price
List Manager 6.0	Management controls for users, list subscriptions, addressing; Web interface	$4,100 per server
Quota Manager 5.0	Templates; reporting engine; Explorer interface	$1,100 per server

List Manager 6.0, which allows automated management of Internet mailing lists through Exchange Server, boasts a number of new administrative features. For instance, net managers can now use the software to dictate which users have privileges for subscribing to lists.

Version 6.0 also lets administrators automatically eliminate users from a list. The feature is especially important when e-mail addresses are retired or changed because list servers can generate hundreds of messages per address per day. Transmissions to bogus addresses can gobble valuable processing time on corporate servers.

The tool also includes an inquiry feature that provides a list of users and the lists to which they subscribe. It supports distribution lists stored in either global address lists or Exchange personal address books. A Web interface lets users subscribe to lists using a corporate intranet site and HTML forms.

List Manager is making life easier for John Romero, senior LAN administrator at Criterion, a human resources consulting and software company.

"I know Unix is robust, but we are an NT shop and an Exchange user, so we needed to work from those platforms," says Romero, an early user of Version 6.0. List Manager has saved Romero from the tedious job of manually administering lists through Exchange. "It's now easier to delegate to other administrators the tasks of creating and managing lists," he says.

Meanwhile, NTP's new version of Quota Manager is designed to ease the job of setting disk limits in shared and individual directories in NT.

Version 5.0 includes a reporting engine, which could be an important tool for customers, given that Windows 2000 will include native support for disk quotas. Companies such as NTP and HighGround Systems must evolve their disk quota products because Microsoft will soon be giving away disk quota technology, says Chris King, an analyst with Meta Group.

The 5.0 release also includes support for templates, an Explorer-like interface and soft quotas. The soft quota feature sends a warning message before locking down a disk that has exceeded its mandated capacity.

NTP: (800) 226-2755

Megarouters,

continued from page 19

increases — and that's where DWDM comes in.

This technology uses multiple wavelengths, or colors of light, that are fired down a single fiber to multiply fiber capacity. DWDM switches use lasers to divide incoming traffic — voice, video and data — into separate optical wavelengths, or light streams.

DWDM is usually targeted for the core of service providers' optical networks. But start-ups such as Sycamore Networks and Monterey Networks are developing gear that makes it cost-effective for enterprises to increase the capacity of their fiber cabling via DWDM.

Indeed, internetwork vendors such as Cabletron and Nortel Networks have recently announced plans to add DWDM capabilities to their campus switches in recognition of the moves toward converged network traffic and increased bandwidth use.

"It doesn't take too much before 5,000 users, each requiring 10M bit/sec full duplex, turns into a 50G bit/sec full-duplex backbone," Chatter says. "That's 25 OC-48s, and that requires DWDM."

To DWDM equipment, OC-48 is a single channel in a 40-channel pipe, and 40 OC-48s add up to 100G bit/sec of bandwidth. Multiple DWDM pipes require a routing switch that can handle hundreds of gigabits. If a campus network supports 10,000 or 20,000 employees, bandwidth requirements stretch into the terabit range.

"High bandwidth is going to become a commodity," NetCore's Dahod says.

Initially, enterprises will gain access to optical wavelengths for point-to-point connections with some ability to reroute around failures, Dahod says. But Layer 2 and Layer 3 intelligence now provided by equipment in service providers' networks — equipment from the likes of Nexabit and NetCore — will have to be added to enterprise nets as these dumb, cheap wavelengths enter and exit them.

More Online
- Overviews of terabit-router vendors and their offerings.
- An explanation of dense wave division multiplexing.

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"It simplifies the job for the carriers by getting them back into the Layer 1 business and letting the corporations add Layer 2 and Layer 3," Dahod says.

The best way to enable corporations to provision their high-speed Layer 2 and Layer 3 services may be through Gigabit Ethernet, says Pete Chadwick, vice president of marketing for terabit router start-up Avici Systems in Billerica, Mass. "There could be a requirement for boxes in the 50G to 100G bit/sec range with Gigabit Ethernet interfaces on them," he says.

Still, Chadwick says the likelihood of an enterprise actually installing a network made up of many terabit routers is "a harder stretch . . . Certainly, we're not doing anything to specifically target the enterprise."

The question of whether terabit routers will be used in the enterprise may become less important as companies outsource more of their network operations to service providers, says Joe Furgerson, vice president of marketing at Juniper Networks, another maker of big, fast routers.

"Enterprises are redefining the public/private network interface," he says. ◩

QUICKTAKE

Radware's WSD-Pro+

Radware's latest server load-balancing switch, the WSD-Pro+, is packed with new features to speed Web traffic moving in and out of the network. The company says the switch, which was announced last week at NetWorld+Interop 99, is 250% faster than the older WSD-Pro.

The greater speed comes in part from a new feature, called Local Triangulation, which lets the traffic bypass the switch on its way back to the Web. With the Local Triangulation configuration, incoming Web traffic goes through a router, into the switch and then into the servers. Outbound traffic goes from the servers directly to the router.

The WSD-Pro+ also features a Java-based SNMP management tool called ConfigWare. The switch is shipping now and costs $15,300.

Radware: (201) 512-9771

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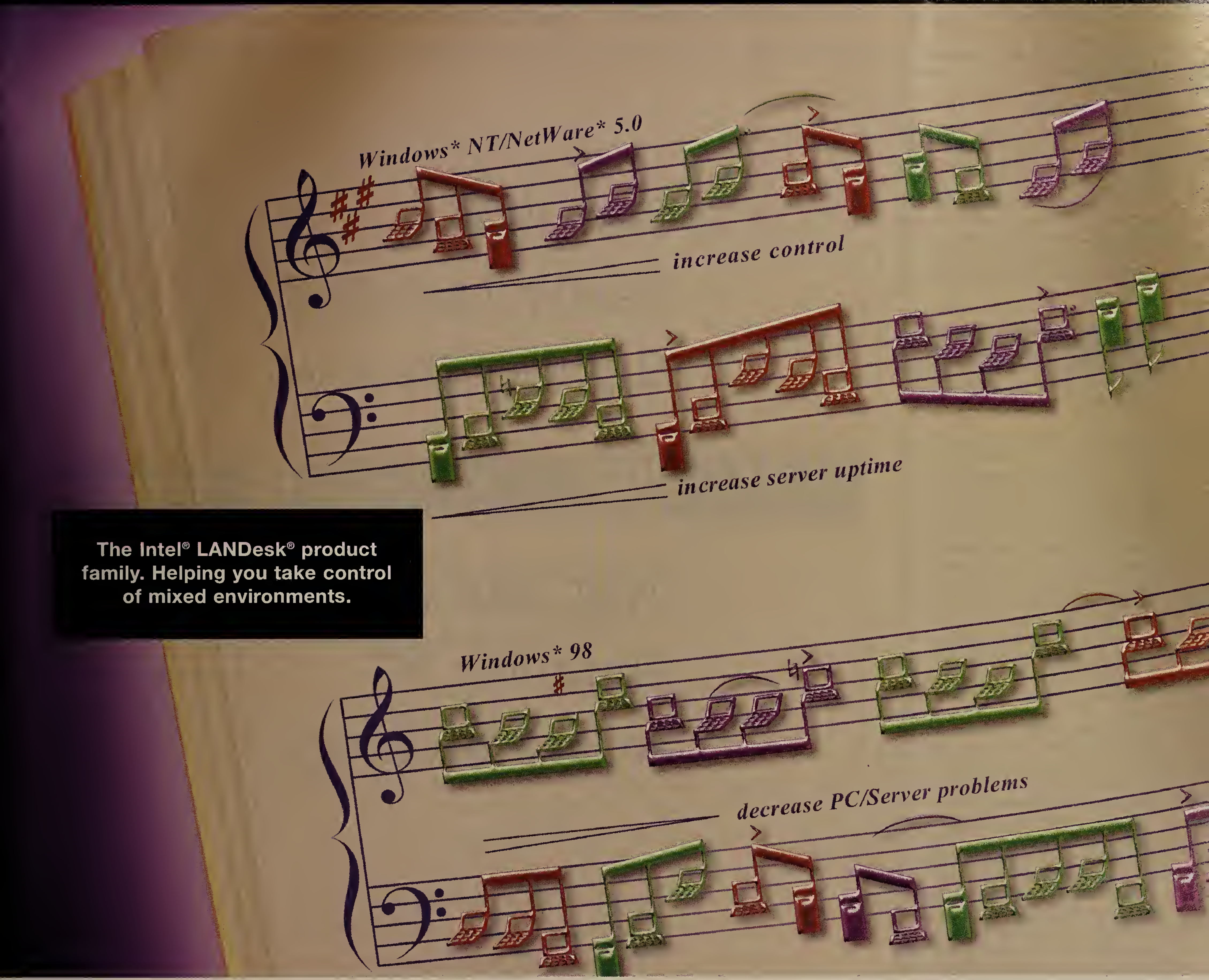

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Altiga VPN concentrators to back up one another

BY TIM GREENE

FRANKLIN, MASS. — Altiga Networks has revised the software for its virtual private network concentrators to ensure that customers' Internet VPNs are not vulnerable to single points of failure.

New software for the company's C10, C20 and C50 VPN concentrators lets two or more of the devices back each other up.

The gear can be arranged so one concentrator is in hot standby in case another fails. Also, groups of concentrators can share the load of terminating and encrypting incoming and outgoing traffic.

Customers can now balance traffic loads across Altiga's VPN boxes.

Previously, the concentrators had to stand alone to authenticate and authorize remote users tunneling into corporate networks via the Internet. If a box went down, so did the VPN.

Idexx, a veterinary products manufacturer located in Westbrook, Maine, plans to use the revised software to back up one Altiga concentrator with another. The company relies on its VPN to give remote users access to its corporate LAN, says Craig Darling, a network analyst for the company.

Altiga's new failover capabilities could save Idexx money, according to Darling. He says he'll be confident enough in the VPN to eliminate some frame relay lines. However, Darling does plan to keep some dial-up ISDN ready in case the connection between Idexx and the Internet goes down.

Altiga already employs Cisco's Virtual Router Redundancy Protocol (VRRP) to enable several Altiga devices to operate together using a single IP address. If the primary device fails, the address moves to another in the pool.

Idexx's Darling says VRRP support simplifies administration. If a device goes down or is added to a network, VRRP-compliant devices are made aware of the change and reconfigure themselves.

The new Altiga software will come with the company's concentrators. Existing customers can upgrade to the revised software for free.

Altiga has been on a roll of late. The company recently garnered more than $12 million in second-round venture capital funding.

Highland Capital Partners of Boston led the round. First-round investors Bessemer Venture Partners of Wellesley, Mass., Columbia Capital of Alexandria, Va., and Commonwealth Capital Ventures of Wellesley also participated in this latest round of funding.

Altiga plans to use the money to bolster its sales organization and customer support network.

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Internetworking Monitor . Kevin Tolly

THE OTHER Y2K STORY

If you're the squeamish type who has vowed to keep your distance from anything computer-based this New Year's Eve, here is something else to consider: GPS Week 1024.

On Aug. 22, 1999, the satellites constituting the Global Positioning System (GPS) will have their own Y2K scenario as Week 1023 ends and the system rolls over to Week Zero. (A GPS Cycle is 1,024 weeks.) The week number is broadcast from each GPS satellite as part of the GPS navigation message. As with Y2K, nobody is completely certain what will happen when Week Zero pops up.

The GPS was developed as a location-tracking tool for the U.S. military. The U.S. Department of Defense deployed and maintains the dozens of GPS satellites stationed in geosynchronous orbit above Earth. Signals from these satellites are used by GPS receivers to calculate the latitude, longitude and altitude of the receiver location in real time.

In a few short years, GPS has become the favored method of tracking location for mariners, aviators and hikers. A fully functional handheld GPS receiver can be had for $150. Even traveling salesmen have adopted GPS devices — linking the unit into computer-based mapping systems in their cars.

What, pray tell, does this have to do with internetworking? Well, network managers might not care about location, but they do need to know the time. More than that, for certain network management and troubleshooting functions, they need to know the exact time. They need clock synchronization.

Running traces to log a series of discrete events or packet transfers is what network managers must often resort to when attempting to diagnose a complex problem. For example, analyzer/trace tools might be placed at two different points on a network, say New York and Chicago, and packets entering at New York and transiting Chicago could be traced to determine if any are being dropped or modified. If the clocks are out of sync on the two analyzers, then just finding the packets in question could be an ordeal. And, if packet latency is an issue, the synchronization of the clocks is even more critical.

One could perhaps pull the clock from an Internet site. But depending on the latency on the Internet between source and destination, the accuracy of that time will vary. Not good enough for intense troubleshooting.

Some high-end network analyzer vendors have solved the problem by developing products that leverage the GPS system to provide a clock source that would allow geographically separate units to maintain accurate — and thus synchronized — clocks. Who knows how many troubleshooting systems pull their clocks from GPS units?

Not to worry, though — GPS manufacturers are fairly sure the rollover won't cause problems. Garmin International, a major vendor of these devices, says newer products won't have a problem. But, the vendor warns, "Some older Garmin products will need to perform an 'auto locate' or 'search the sky' operation one time, the first time they are turned on following the GPS week rollover event, in order to acquire satellites and perform navigation functions."

Remember, you heard it here first.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.

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Keynote Address by John Curtis
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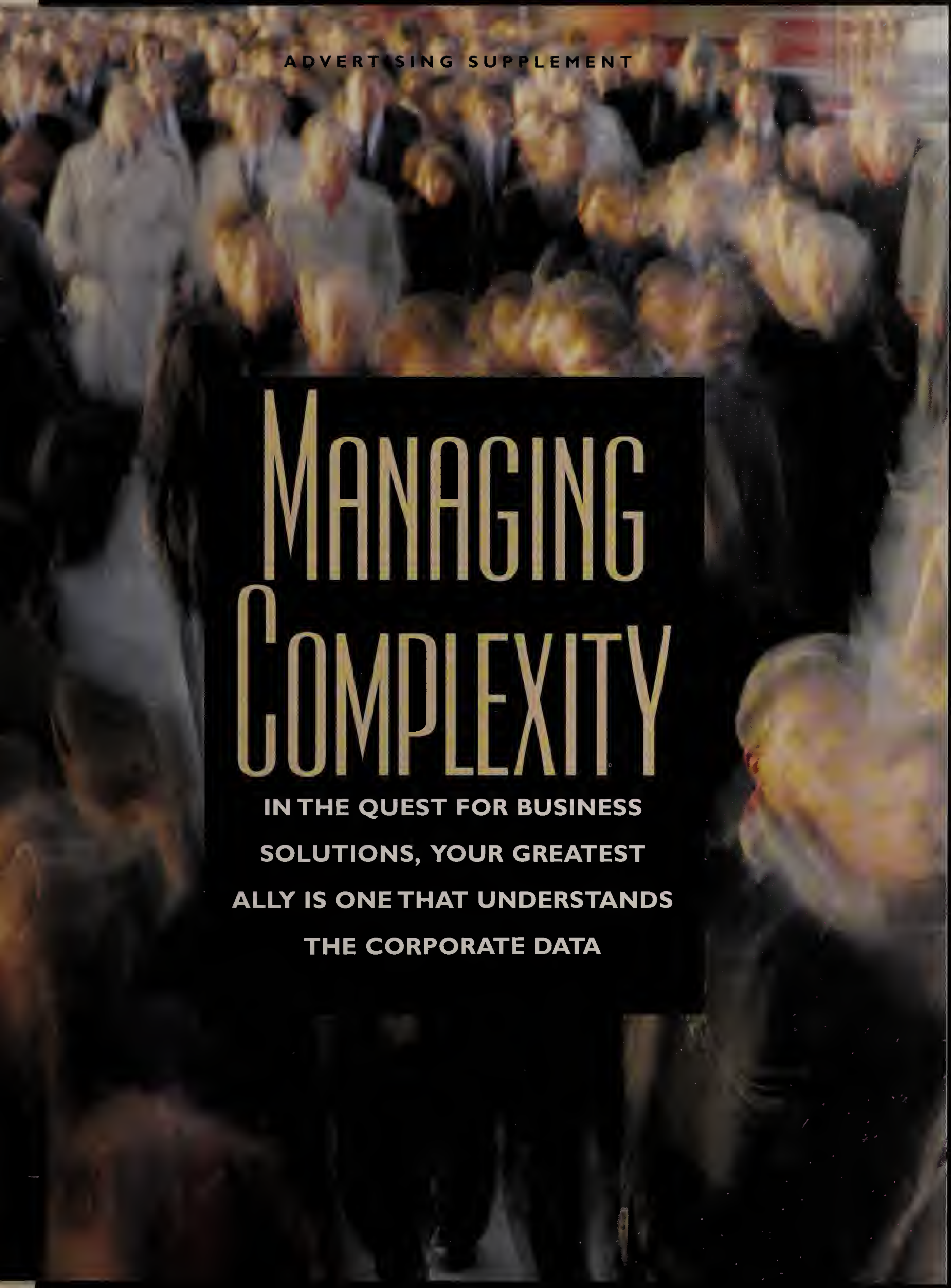

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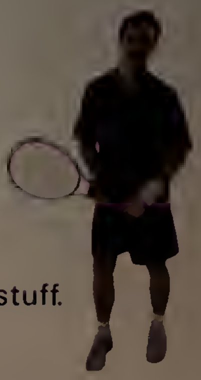

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REDUCING IT COMPLEXITY

WITH WINDOWS NT

THE MAELSTROM OF TECHNOLOGY CHOICES CAN BE OVERWHELMING. A GROWING NUMBER OF ORGANIZATIONS ARE STEMMING THE TIDE BY STANDARDIZING ON WINDOWS NT.

THERE ARE COMPLEX IT ENVIRONMENTS, and there are complex IT environments. And then there's the Nasdaq Stock Market. With rapid growth driven by a sonic boom in the listings of high-tech stocks, Nasdaq needed a system that could monitor each of the billions of trades it will soon handle – up to 4 billion each day by 2002. Its system would need to provide extremely high availability while seamlessly and securely processing data from multiple sources.

John Hickey, Nasdaq's chief technology officer, was the first to recognize that yesterday's technology is no match for today's thorny business problems. "The proprietary trade and quote monitoring system we had in place served us well, but it was unable to deal with the complexity of our trading environment," Hickey notes. "It was impacting our ability to do business."

The solution for Nasdaq – and for a growing number of organizations worldwide – is to reduce IT complexity by exploiting Microsoft Windows NT, which offers the ease of use, integration features, low cost and other attributes necessary for a simplified IT environment.

Why Windows NT? Simply put, Windows NT is emerging as a global standard for reliable, scalable and secure computing. The operating system has already earned a solid reputation for its low cost of administration, its compatibility with heterogeneous computing environments, its ability to host e-mail systems and personal productivity software, and its support for a broad range of software applications.

Now, Windows NT is increasingly finding success in transaction-intensive, mission-critical environments. How? Leading IT vendors such as Unisys are applying their decades of enterprise computing experience to bolster the operating system's reliability, scalability and security through enterprise-class hardware, software and services.

"We have worked closely with Windows NT for several years and understand how to combine its capabilities with state-of-the-art middleware to achieve mainframe-level performance," explains Paul Rachal, vice president and general manager of Enterprise NT for Unisys. "We also have the expertise to ensure that Windows NT provides a solution that meets specific business objectives, and to develop a computing architecture that melds easily with existing infrastructures while preparing for future needs," he says. The result is that Windows NT is becoming the system that IT management is most comfortable planning on for the future.

EASE YOUR IT MIND

Organizations today are faced with a crazy-quilt infrastructure of mixed computing platforms, demands on IT resources that double and triple every year, and a chronic shortage of skilled IT staff. "A lot more functionality is being automated within IT systems," says Robert Dorin, a senior analyst with Aberdeen Group in Boston. "The whole infrastructure of information technology has become more complex." Add to that a pace of technology change increasingly driven by "Internet time," and it's no wonder organizations are looking for ways to reduce that complexity and ensure IT investments contribute to business success.

How can Windows NT help? Let's start with ease of use. At many organizations, understaffed IT departments barely have enough personnel bandwidth to maintain current operations, notes Joe Clabby, vice president of platforms and services at Aberdeen. That means companies can't take advantage of IT to exploit new business opportunities. And that's one good reason Windows NT has curried such favor: Its relative ease of use compared with other enterprise computing platforms reduces recruiting and training costs, easing demands on existing staff.

"Windows NT is making a big impact because it offers a standardized software platform," notes Richard Fichera, vice president of research at Giga Information Group in Cambridge, Mass. "That 's a major attraction for IT management, because it carries with it the benefits of standardized training, software and skill sets."

Just as important is the availability of a broad

WINDOWS NT POSTS BIG GAINS

Percent of business applications supported by each operating system today and two years from now

Operating System	Today	In two years	%Change
Unix	30%	31%	3.6%
NT Server	31.6%	44.1%	39.3%
Netware	27.7%	17.6%	(-36.6%)
Others	10.9%	7.4%	(-32.4%)

Source: Computerworld Information Management Group; base of 201 responses

MAKING THE TRADE

Windows NT will allow the Nasdaq Stock Market to monitor mission-critical, real-time market activity

Don't tell John Hickey and Ed Flynn that Windows NT isn't reliable, won't scale or doesn't support high-volume transaction processing environments over an extended period. Why? Because they will tell you about the results of 30 benchmark tests in which two Unisys servers running in parallel under Windows NT processed up to two billion trades in a single simulated day.

Hickey is executive vice president and chief technology officer of the Nasdaq Stock Market. Flynn is director of Nasdaq technical architecture. They worked with Unisys to conduct the groundbreaking tests, which proved that Windows NT can support Nasdaq's mission-critical, real-time system to facilitate regulatory oversight of market activity.

Specifically, the proof-of-concept tests were used to gauge the feasibility of developing Nasdaq's new Surveillance Delivery Real-Time (SDR) application for the Nasdaq MarketWatch department. SDR will analyze quote, trade and news transactions and send alerts to MarketWatch analysts for review.

Nasdaq moved to Windows NT in part because of its scalability. The benchmark test data revealed that, in addition to running 800 transactions per second continuously for the equivalent of eight trading days, the Windows NT-based system provided analysts with alerts within 200 to 700 milliseconds – well under the two-second allowable limit – and demonstrated instant recovery from failure tests with no data loss and immediate backup system availability. "NT does range of software applications for the Windows NT platform. Microsoft has galvanized a prodigious number of software makers to develop many off-the-shelf solutions for Windows NT. The result: IT departments can spend less time developing software for basic operations and more time creating solutions that provide competitive advantage.

Ease of integration is another weapon Windows NT brings to the war on IT complexity. Windows NT integrates well with UNIX and proprietary systems, enabling organizations to retain their investment in existing IT infrastructures while transitioning to a less complex IT environment. In fact, in a recent survey of 500 North American IT executives by Framingham, Mass.-based International Data Corp. (IDC), nearly half said they plan to migrate some of their UNIX database functions to Windows NT and expect little trouble doing so.

FROM DESKTOP TO DATA CENTER

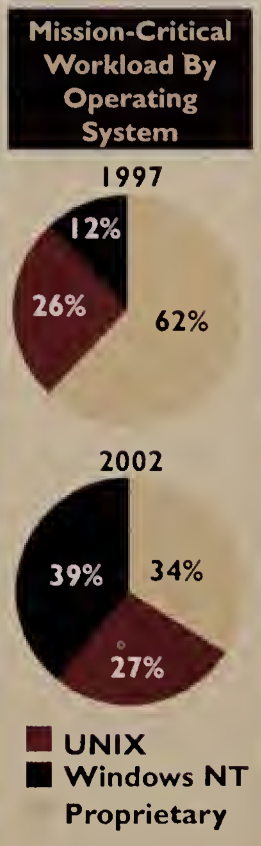
But how does Windows NT play in the data center, where mainframes traditionally have handled highly sensitive, mission-critical workloads? "Today, much of the mainframe's power and reliability are available in Windows NT," says Rachal. "Enterprise IT vendors such as Unisys offer powerful hardware that provides the necessary scalability, plus sophisticated software that ensures the highest levels of availability and security.

"Perhaps most important," Rachal continues, "we offer the full range of services – from planning and installation to migration and integration, from application development to network and system management – that is required for truly enterprise-class computing."

The experiences of Nasdaq and other organizations bear that out – a fact that has not gone unnoticed by CIOs and other business leaders. A recent survey of nearly 300 North American and European executives conducted for Unisys by independent research firm SOFRES Intersearch in Paris, shows that by 2000, Windows NT will surpass UNIX and proprietary systems as the operating system of choice for both mission-critical computing and overall workloads.

Likewise, an IDC study found that 40% of the units of server software sold were Windows NT – about double the amount of UNIX server units. And a recent study by *Computerworld* newspaper shows that Windows NT is registering significant

CONTINUED ON PAGE 6



SOURCE: SOFRES INTERSEARCH

scale," insists Flynn. "As more and more processors were thrown into the mix, the system gave us the scalability we needed."

Windows NT will offload such jobs as disseminating information and building indices, he explains, freeing up vital mainframe capacity. Asked if he believes Windows NT systems will begin performing those core mainframe tasks themselves within the next few years, Flynn responds, "I don't think that's too far-fetched at all."

Flynn cites the cooperative role played by Unisys in supporting Nasdaq's high-end Windows NT system. Unisys responded quickly to Nasdaq's needs, he says, providing invaluable expertise and architectural advice. He attributes some of that nimbleness to the tight relationship between Unisys and Microsoft. But ultimately, says Flynn, Nasdaq chose Unisys as a partner because it offered the Windows NT solutions Nasdaq needed to succeed.

MIKE TAMBORRINO/MERCURY PICTURES

Nasdaq Stock Market's Executive Vice President and Chief Technology Officer John Hickey uses a Windows NT-based system to support mission-critical market activity

GOT MILK? GOT DATA!

Michigan dairy co-op relies on Windows NT and the Internet to simplify data access

MMPA's Greg Schulkey gets critical information to dairy farmers using a Windows NT-based extranet

DWIGHT CENDROWSKI/MERCURY PICTURES

Getting information to members of the Michigan Milk Producers Association (MMPA) is the Number 1 priority – and pain point – for Greg Schulkey, MMPA's IT director. He is meeting that priority and easing his pain by relying on a combination of Windows NT and Internet technology.

MMPA is a member-owned and operated dairy cooperative serving more than 2,900 dairy farmers in Michigan, Ohio, Indiana and Wisconsin. It is the largest dairy cooperative in the region and provides a variety of services, ranging from lab tests to windstorm disaster-recovery plans.

The organization is using a Windows NT-based extranet to get critical information to both employees and members. For example, MMPA posts the amount and quality of milk received from each farm, making it easy for farmers to track their business with the cooperative. In addition, field representatives can access the network remotely to check e-mail or track changes in the cheese and butter markets, and customers can use the network to contact the sales department. "Our extranet saves us a lot of money," says Schulkey, "and it allows us to be responsive in ways we could never have dreamed of a few years ago."

For farmers that produce millions of pounds of milk per month, fast information access can have a major impact on the bottom line. For example, farmers use the extranet to access results of lab tests that show how changes in feed rations affect milk production. And the sooner they get that data, the faster they can optimize feed expenses.

MMPA runs its extranet on two Unisys ClearPath systems that are partitioned to support both the proprietary Unisys environment and Windows NT. "There's very high-speed connectivity between ClearPath and Windows NT," Schulkey notes. "It's easy for us to get to mainframe data from either the Windows NT side or an Internet application."

A major reason Schulkey chose to work with Unisys was for its understanding of corporate data. "They've been around the enterprise from the beginning," he says. "Unlike a lot of vendors that started out as PC manufacturers, they understand the criticality of data to companies." ☾

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REDUCING IT COMPLEXITY

CONTINUED FROM PAGE 5

gains in momentum and market share at the expense of other platforms.

In fact, Windows NT will become the mission-critical operating system of choice for the future, according to the SOFRES survey. Specifically, the study shows that 75% of organizations are implementing or planning mission-critical applications on Windows NT.

For a growing number of organizations, it's becoming clear that Windows NT is a platform equally appropriate for desktop computers, local-area networks, departmental servers and transaction-based systems. That means they can standardize on the operating system to reduce the complexity of their IT environments. It also means they can ensure easy sharing of information across the enterprise and, ultimately, realize tangible business benefits from their IT investments. ☾

WINDOWS NT:

ANSWERING ENTERPRISE NEEDS

David Houseman, vice president of Advanced Technology for Unisys, describes the advantages Windows NT offers in simplifying IT environments and how it helps IT organizations contribute to the strategic goals of the enterprise.

RICHARD BOWDITCH

Q A major contributor to the complexity of today's IT environment is the proliferation of mixed computing platforms. Weren't standards supposed to help cure all that?

A That certainly was the intention. But I judge the effectiveness of a standard by the degree to which it allows users to take an application and run it on the broadest array of platforms possible. So I wonder how much value emerged from the standards movements of the past decade.

The problem for IT vendors is that standards neutralize their ability to differentiate their offerings – a situation exemplified by the UNIX operating system. UNIX was supposed to be an open platform, but each vendor enhanced and modified it in an effort to differentiate itself. We ended up with so many different flavors of UNIX that organizations weren't much closer to simplifying their IT environments than when proprietary operating systems ruled.

Q How much of a solution does the Windows NT platform offer?

A For Unisys, our customers tend to be larger enterprises where the need to integrate systems serving disparate departments is particularly pressing. We would not have made the level of commitment to Windows NT that we have today if we didn't find it offered substantial strategic advantages to our customers.

The most compelling reason Windows NT is successful in reducing IT complexity is that there is only one version of the operating system. Having focused for much of its history on the desktop, Microsoft entered the enterprise market relatively late. So it had the advantage of witnessing the fragmentation of UNIX. The lesson learned was simple: To maintain a standard platform, you need to keep the source code under lock and key. No one modifies it except Micresoft. As a result, any Windows NT application will run on any Windows NT platform, period.

Windows NT is also intrinsically a simpler operating system than UNIX for both the user and the administrator.

Q How does Unisys add value to Windows NT, particularly in the area of reducing complexity, to offer clients a compelling reason to invest in the technology?

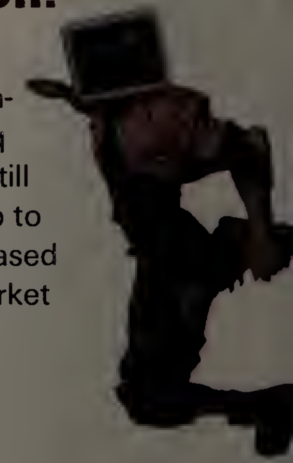
A A single large system is less complex to manage than distributed systems. We are working to bring the advantages of large mainframes to Windows NT, combining them with the cost advantages associated with the Intel platform.

One way to simplify an IT manager's life is to make the technology reliable. New tools added to commodity Intel and Microsoft platforms improve system availability and simplify system management. Windows NT doesn't currently provide a way of automatically discovering when a system service is no longer responding. So we bundle additional software with our Aquanta ES5000 servers that automatically scans for interruptions, reports them and provides tools to streamline recovery.

In addition, we offer a range of IT services that help bring attributes associated with mainframe computing – including bet-the-business reliability and vaultlike security – to Windows NT. We've been providing these kinds of services for decades, and now we're applying that expertise to the Microsoft operating system.

With the technologies and services we offer, we intend to bring to distributed systems many of the advantages once available only on mainframes. We feel confident that the result will be an IT environment that contributes to the goal of the enterprise. ☾

It's not that we can't stop working on a client's problem. It's just that we hate to quit when we're on a roll.



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Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

Chicago-based competitive local exchange carrier **Focal Communications** has decided to follow in the steps of other CLECs and link its local networks via a national ATM network.

Focal says it has agreements with multiple carriers to lease about 10,000 DS-3 fiber miles of transport capacity nationally to link its local markets. Focal says the company will increase its local presence to 20 markets, with newly announced entries into Atlanta, Houston, Minneapolis and Cleveland.

Lucent last week said it has developed a computer chip for phones that will help small and mid-size businesses use their computer networks to deliver voice calls.

The chip will help lower the cost of Internet phones from about $250 to $150 by decreasing the number of chips in a phone from five to one. Internet telephone systems meld voice and data using a single wall jack.

According to Lucent, the market for Internet telephone sets is expected to average annual growth of more than 250% over the next three years.

US WEST last week said it will, by year-end, ship two telephone-computer hybrids that feature one-button dialing to the Internet and other simplified ways to use the Web.

The WebTouch phones will be made by Alcatel and will operate similarly to PC modems to dial any Internet service. WebTouch phones will be faster because there will be no waiting to boot up a PC or open an application.

Pricing of the new phones was not released.

US WEST: (800) 879-4357

Bandwidth management help is on the way

Vendors introduce new tools and programs designed to ease network traffic monitoring.

BY DENISE PAPPALARDO

LAS VEGAS — A handful of vendors launched new products and programs last week at NetWorld+Interop 99 designed to make monitoring your IP traffic easier.

Paul Blondin has been named IPHighway's CEO.

Among these companies is Elron, which rolled out a product that monitors network traffic and generates reports in real time. The company's Command View Bandwidth Analyzer can alert net administrators when network congestion is peaking and identify which applications or end users are to blame. The software can be used, for example, to determine the amount of network bandwidth being chewed up by end users accessing internal and external Web sites.

While this product does not allow users to reduce bottlenecks, the company's first product can perform this task. Elron's Bandwidth Optimizer can shape traffic via queuing and TCP rate control technologies.

Command View Bandwidth Analyzer runs on Windows NT Server and is available now for about $900. Users can upgrade to Elron's Bandwidth Optimizer software starting at around $1,000 for a 64K bit/sec dedicated Internet connection.

While Elron's products are aimed at enterprise users, IPHighway is taking a different approach with its latest product.

In addition to announcing that Paul Blondin is the company's new CEO, IPHighway also announced Open Policy System (OPS), a policy manager. OPS will let ISPs set and enforce bandwidth usage rules on hundreds to thousands of devices from a central site, says Shai Herzog, chief technology officer at IPHighway.

Policy management capabilities can be key for ISPs trying to deliver guaranteed classes of service to Internet access customers. IPHighway says a few ISPs have committed to trying OPS, but the company declined to disclose any names.

IPHighway, NetReality and Packeteer also announced new programs designed to bring their bandwidth management technologies to additional products and applications. IPHighway is announcing its NetQuality Alliance Partners Program, which makes the company's Policy Client available to vendors that want to ensure their products can be managed under policy-based schemes in multivendor networks.

Separately, NetReality announced its WAN-Open Environment, a program through which the company will provide application developers with compression algorithms as well as Web caching and firewall technologies. The company will encourage developers to use these established technologies and devote resources to new technologies and applications.

Meanwhile, Packeteer announced that it is making its bandwidth management software, called PacketWise, available to other equipment vendors such as ADC Kentrox. ◪

More Online

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- More details on the products mentioned here.
- Columnist Tom Nolle's predictions on free bandwidth.

www.nwfusion.com

QUICKTAKE

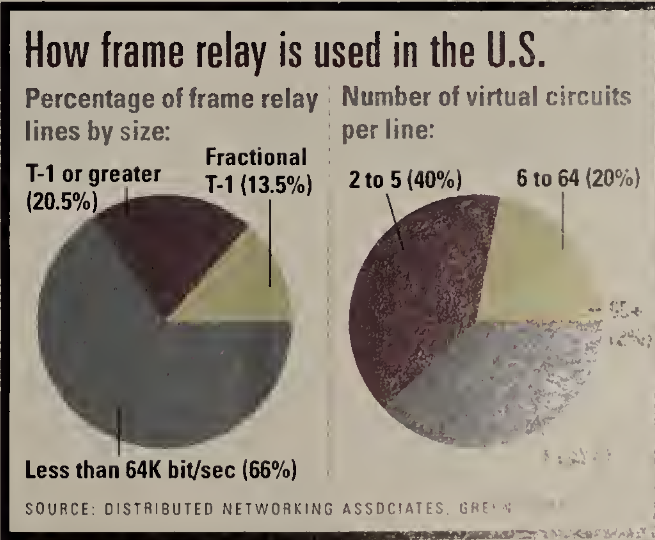
Frame relay on the rise

Use of frame relay continued to boom last year, with the number of customers worldwide jumping by 48%, according to a Frame Relay Forum survey presented last week at NetWorld+Interop 99. That exactly matched the growth rate in the U.S., up from a rate of 37% last year, according to the study conducted by Distributed Networking Associates.

While fewer carriers replied to the survey this year vs. last, some of that attrition can be attributed to mergers and acquisitions among carriers, according to Steve Taylor, president of Distributed Networking. Still, the carriers that did answer the survey are some of the largest in the U.S. and serve the bulk of users, so the projected results are significant, Taylor says. "It certainly says frame relay isn't dead," he says.

Last year's big AT&T frame relay network outage might have helped fuel the growth, Taylor says, because customers are buying more backup frame relay circuits from multiple carriers to protect themselves from any one carrier's crashes.

In addition, customers buying frame relay for the first time may be doing so to back up new IP virtual private networks.



How frame relay is used in the U.S.

SOURCE: DISTRIBUTED NETWORKING ASSOCIATES, GRE

Eye on the carriers . **David Rohde**

FCC IS THE WRONG PLACE TO GO FOR MARKETING HELP

Ever since 1995, when Newt Gingrich's bunch blew into Washington, there have been periodic movements to abolish the Federal Communications Commission. The theory is that all carriers would focus more on marketplace needs and build better networks if they didn't have to kowtow to regulators.

I've never thought much of this idea. I figured the regional Bell operating companies needed to be guided and even coerced into a competitive world.

But if there was ever a good argument for ditching the regulator, a small competitive local exchange carrier (CLEC) called KMC Telecom provided me with one when it recently filed a special petition at the FCC.

The problem isn't the people who run the FCC or even their policies. The problem is that the mere existence of a government agency regulating telecom services leads carriers to turn to the agency for help, when they really ought to be building a better mousetrap.

KMC's petition raises a legitimate problem. Facing imminent competition, RBOCs and other dominant local carriers signed users to term contracts of three years or more for ISDN, SONET, Centrex and other services. The bait for users is a lower rate than the RBOCs charge for month-to-month service. The catch is that if users switch to a CLEC before the contract expires, they're hit with a huge penalty.

KMC wants the FCC to ban dominant local carriers from charging termination penalties. The firm says the penalties are a "barrier to entry," a loaded term with antitrust overtones.

But are the penalties really a barrier? The users could have stayed with month-to-month service or chosen shorter-term contracts at lower discount levels. KMC is free to make contacts with users, learn when their deals expire, prep request for proposal responses and even start bidding for any new traffic. That's how new long-distance carriers get started (before they offer contracts with their own termination penalties).

Besides, most CLECs announce their presence in a city well before their nets are ready, giving users an extra cushion of time to evaluate their options.

One wonders what this CLEC is telling investors: "Give us a lot of money so we can build networks where we have no chance of winning any business." Not likely — KMC's literature boasts that it's "one of the fastest-growing providers of customized telecommunications services in the United States."

But KMC's tone is different in Washington. "As a new market entrant to historically closed markets, KMC is subject to substantial competitive disadvantages in the telecommunications marketplace," whines the company's FCC petition.

This just doesn't seem like the FCC's problem. Contract-termination penalties aren't mentioned once in the telecom reform act or the thousands of pages of resulting regulations. Of course, KMC has "competitive disadvantages" vs. the RBOCs, starting with the fact that its company name doesn't include the word "Bell." Should the FCC do something about that, too?

Rohde is a senior editor with Network World. He can be reached at drohde@nww.com.

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How changing carriers just got easier for you

LOCAL NUMBER PORTABILITY

New system lets users change carriers but keep their old phone numbers.

BY DAVID ROHDE

For years, advocates of local phone competition have warned that switching local carriers is really two procedures, not one.

First, the incumbent carrier turns off its service. Second, the new carrier turns on its service. What often comes in between is a terrifying gap of a day, a week or more, with no phone calls, faxes or dial-up network access — nothing.

It's not that the new competitive carriers want it that way. It's just that the Bells and other dominant carriers have a knack for yanking their own wires before the cutover to a competitive local exchange carrier (CLEC) is fully complete. Fortunately, after years of pressure, one holdup in the process is starting to disappear: the need to switch phone numbers.

Until the end of 1998, users in almost all geographic areas faced an unappealing choice when migrating to a CLEC. Users had to get new phone numbers from the CLEC and advertise them to all remote users and customers, or they had to use remote call forwarding to have calls to existing numbers forwarded to unpublicized dummy numbers issued by the CLEC. Reason: Under current telephone switching systems, carriers can't share numbers in the same telephone exchange.

Now in many areas there's a third option: local number portability (LNP). Under a mandate from the Federal Communications Commission, the telephone industry has installed a system in the top 100 metropolitan areas in which calls to individual phone numbers can include a brief "dip" into a central database before the call is completed. The dip determines which local carrier controls the number. When a user switches from one carrier to another, the database is updated to reflect that change. The result is that an organization can keep its phone numbers when the company switches carriers.

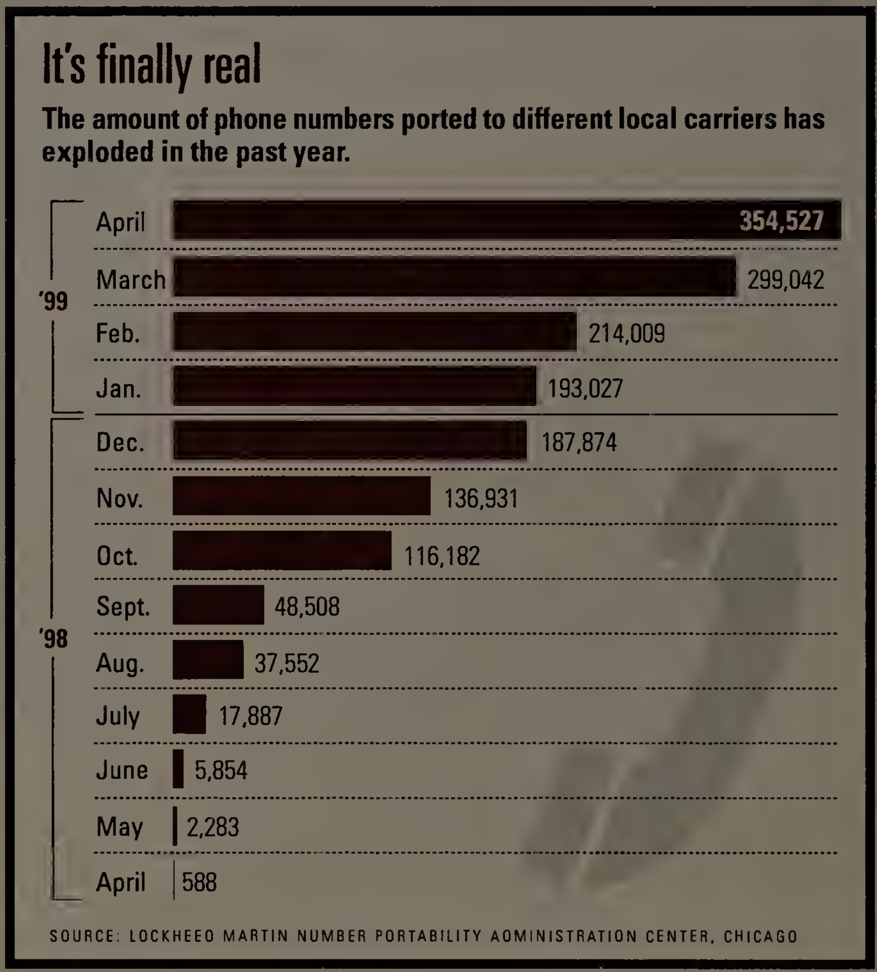
This database system — administered by a division of Lockheed Martin — doesn't solve the wholesale shortage of phone numbers the country is facing over the next few years. Most users who change carriers still get new phone numbers for a variety of reasons: They're setting up new locations; the user is unaware of the database-dip option; the option is unavailable in a user's city; or the CLEC doesn't offer LNP.

But LNP has been a blessing in some individual user cases. Normally the system is used for small batches of phone numbers that a small office moving to a CLEC would use. But LNP is starting to be found in large implementations as well. For example, last fall at Travis Air Force Base in California, a Vancouver, Wash., CLEC called GST Telecommunications unseated Pacific Bell and won a five-year contract to provide all local telecom services to the base and an associated hospital.

GST implemented LNP at its nearest switch site, in Walnut Creek, Calif. The ISP then cut over more than 11,500 lines at the base without changing any of the phone numbers. GST officials think that was key to making the sale: "Local number portability is the key to true competition for local telephone services," says GST President and CEO Joe Bastile.

The Telecommunications Act of 1996 mandated LNP. Under those rules, revised several times, the industry was supposed to be ready for LNP by March 31, 1998. But that date rolled around and the system wasn't in place because it was mired in software delays and regulatory controversies (*NW*, April 13, 1998, page 1).

In April 1998, only 588 numbers were ported nationally — about half the Travis installation alone. The FCC put its foot down and said all 100 metropolitan areas must be ready for LNP by Dec. 31, 1998. Since then, the amount of ported numbers has shot up, rising every month at a healthy pace (see graphic).



It's finally real

The amount of phone numbers ported to different local carriers has exploded in the past year.

SOURCE: LOCKHEED MARTIN NUMBER PORTABILITY ADMINISTRATION CENTER, CHICAGO

Industry experts agree there were two keys to getting the project done: finishing it in 1999 — telcos are resisting any further large mandated software projects until after 2000 — and giving the industry a financial incentive. Many organizations don't realize it, but they're paying for LNP whether they use it or not. Starting Feb. 1, the FCC authorized carriers to add a line item of up to $1 per line on their bills in areas where LNP is available, after the regional Bell operating companies begged for "cost recovery" of their database upgrades. Following last year's brouhaha over heavy universal service fund surcharges, the RBOCs have kept the charges modest. Bell Atlantic came up with a 24-cent-per-month charge uniformly applied to all phone lines; the charge begins appearing on bills this month. GTE began charging 43 cents per month in California in March.

But just because LNP is provided by the incumbent carrier doesn't mean all the CLECs in the area offer it. Many of the smaller, newer CLECs — ones that didn't build out the initial competitive fiber rings in big cities — make the biggest deal out of LNP.

For example, Allegiance Telecom of Dallas made LNP an immediate benefit when it entered the Chicago market in September. At the time, it was one of the few Chicago alternative carriers to offer LNP, even though Chicago was one of the first markets in which the RBOC made the capability available.

Some user consultants have cautioned corporate net administrators to shy away from the system until it's fully proven. Dick Kuehn, president of RAK Associates, a Cleveland firm that specializes in requests for proposals and negotiations for carrier services and CPE contracts, concedes that he's a "chicken" when it comes to relying on newer carrier systems such as LNP.

A key factor in these assessments: Many users retain RBOC trunks especially for inbound calls, while their initial CLEC services are used for dedicated WAN and Internet applications. Other enterprises use CLECs largely for redundancy. In both cases, LNP can be unnecessary if not counterproductive.

Whatever you do, experts say, don't be confused by terminology. The database-dip system is not the only method that carriers label "number portability." Another technology, "interim number portability," is simply enhanced call forwarding. This method results in a perceptible delay in call completion, and since it completes the call twice, it can't handle inconsistencies between the incumbent's and competitive carrier's net features, Allegiance says. Caller ID information may be lost, and conferencing features may be unavailable. ◪

Briefs

Brightware of Novato, Calif., a maker of Internet customer assistance software, has named Chris Erickson president and CEO. The former head of Red Brick Systems replaces Chuck Williams, who assumes the title of chairman at the company he founded in 1995. Erickson's leadership of Red Brick began in 1993.

Brightware: (800) 532-2890

IBM has begun shipping an updated version of its electronic commerce software, net.commerce, for the AS/400. IBM has added a way to set up procurement workflow and created a set of built-in APIs for easy integration with Lotus Notes/Domino. IBM E-business Marketing Manager Suzie Lyons says IBM will also ship a stand-alone payment-processing server, IBM Payment Server for the AS/400, next month.

IBM: (800) 426-4968

Shunra Software has introduced Storm, a $9,000 network modeling product for WAN links. Users create a network map on Storm, specify the parameters for the devices on that network and start the simulation. Storm will show what quality-of-service problems might crop up across the links.

Users can adjust the amount of traffic and other parameters to determine the impact of new applications, new users or other network changes.

NetFormX will unveil software for analyzing network designs. The $2,000 DesignXpert has modules tailored to specific vendors' product lines, showing how to configure network devices. It can also verify that network devices will be able to share common protocols, and it lets network managers design a topology of virtual LANs.

BoostWeb Enterprise bolsters Web apps

Tests yield two- to threefold performance gain, but customer service, support need work.

BY DENNIS WILLIAMS
NETWORK WORLD
TEST ALLIANCE

Anytime a company claims its software can increase performance of any kind by tenfold, we raise our red flag of skepticism.

BoostWorks asserts that its BoostWeb Enterprise, which shipped this month, can increase the performance of Web-based applications anywhere from four to ten times. While our tests indicate more modest gains, we were impressed that the software can raise the performance of Web-based applications by two to three times.

However, the product is not without flaws in conception and execution. Because it uses a client/server architecture, you only see gains from BoostWeb Enterprise on your own intranet. Users without the BoostWeb Enterprise client installed on either their individual desktops or on an intermediary proxy server will see no improvement.

ScoreCard

BoostWeb Enterprise

Server support 25%	9 x .25 = 2.25
Client support 25%	10 x .25 = 2.50
Performance 20%	8 x .20 = 1.60
Management 15%	1 x .15 = 0.15
Ease of use 5%	9 x .05 = 0.45
Installation 5%	9 x .05 = 0.45
Documentation 5%	4 x .05 = 0.20
Total score	7.60

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

And BoostWeb Enterprise fails to provide network administrators with adequate performance feedback. You get no indication of how much benefit you're deriving from the product because while there is a graphical statistics screen, there are no detailed reporting utilities to accompany it.

BoostWeb Enterprise is well-designed and relatively easy to implement. This version extends the capabilities of the company's earlier products, BoostWeb Intranet and BoostSQL, which are designed to bolster the performance of Intranet and SQL applications over congested links. BoostWeb Enterprise extends the intranet version by making it better suited for handling Web-based applications in addition to browsing Web content.

Using client and server components on opposite ends of a slow link, BoostWeb Enterprise tries to maximize the efficiency of the link. To do this, it analyzes the data flow to determine whether GIF, JPEG, HTML or other types of files are being transmitted. Then, it optimizes the transmission of each data type by bundling HTML content and graphics into a single package that is sent to the client. Our tests showed this compression caused no degradation in the resolution of the Web pages.

Net Results

BoostWeb Enterprise
BoostWorks
(415) 464-8190
www.boostworks.com
Price ranges from $261 per seat for 50 users or less to $116 per seat for 3,500 or more users.

Pros

▲ Easy to implement
▲ Improves Web-based performance for all clients

Cons

▼ Expensive
▼ Limited management and reporting capabilities
▼ Inadequate administrator documentation

The client-side software also uses an intelligent cache, which differs from a browser's static cache in that it can determine the elements of a Web page that remain constant and request only the changed components. This feature is especially helpful for form-generating applications.

Also new to the enterprise version is the ability to address latency. BoostWeb Enterprise uses its own proprietary Intelligent Latency Reduction System. By compressing multiple Web components into a single package before transmitting the package across a slow WAN link, the number of transmissions is reduced, which lowers latency.

Using compression and caching, BoostWeb can increase performance by 50%. But by addressing latency as well, performance can improve two or threefold with any application you run across the Web.

Implementing improvements

BoostWeb Enterprise's server component runs on Windows NT 4.0 and a variety of Unix flavors, including Solaris, HP/UX, Tru64, AIX, SCO, FreeBSD and Linux. You must have an HTTP server or proxy server on the same LAN as the BoostWeb Enterprise server. BoostWeb Enterprise is HTTP-compliant, so it works with all proxies, firewalls and Web servers.

You can install the client component on every desktop that needs access to the Web or on just one proxy server. The latter is the better method because it minimizes the number of software installations that must be done. Supported clients include Windows 95, 98 and NT, plus Unix workstations.

We tried running the client software on desktop machines and on a single proxy server. With the BoostWeb Enterprise client loaded on a Windows 98 desktop and caching disabled on the browser, we experienced only moderate performance improvements, ranging from none to 20% (barely noticeable).

When we moved the BoostWeb Enterprise client from the desktop machine to a proxy server, performance improved a little more over our WAN connection. On average, performance was double that without BoostWeb Enterprise, with surges occasionally boosting performance gains threefold.

On the dial-up link, performance gains were similar in proportion but much more noticeable. Cutting the wait time for page downloads from 5 seconds to 2 seconds — as was the case with the dial-up link — is more obvious than reducing a 1-second delay to a half-second.

The installation and configuration was

See **Review**, page 32

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Review,
continued from page 29

a little rougher than we expected. Our problems were exacerbated by the lack of documentation, especially in the areas in which we needed it most — configuration and troubleshooting. And if you have a problem there are no resources to help with troubleshooting. When we called customer support with some configuration questions, we reached an answering machine. Our support call wasn't returned for several days. If you're paying anywhere from $116 to $261 per seat, you expect a basic level of service and support, and we didn't get our money's worth here.

We were left with the impression that the company was rushing this product out the door. While the core technology works, there are too many loose ends.

Still, if you're not happy with the performance you're getting from your Web-based applications, BoostWeb Enterprise may work for you as an alternative to buying additional bandwidth. You just need to compare the cost difference of the two alternatives. ◪

Williams is a freelance writer and product improvement consultant in Alpine, Utah. He can be reached at Dennis@ProductReviews.com.

Williams is also a member of the Network World Test Alliance, a cooperative of the premiere reviewers in the network industry, each bringing to bear years of experience in every review. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.

How we did it

We tested a late beta version of BoostWeb Enterprise. We installed the server component on a Dell PowerEdge 2200 with two Pentium II 233-MHz CPUs, running Windows NT 4.0 Server and Internet Information Server 4.0. We loaded the client component on two Windows 98 Pentium II desktop machines running Internet Explorer 5.0. We disabled the browser's caching feature to test the overall download performance as facilitated by BoostWeb Enterprise rather than the efficiency of the browser's cache.

The first client was connected to the server via a T-1 line. The second desktop accessed the server via an analog dial-up connection.

We used a stopwatch to test how long it took each Windows desktop to load a variety of sample Web pages — with and without the BoostWeb Enterprise client running. The Web pages ranged in complexity from very simple text-based pages to ones containing complex graphics and Java scripts.

In a second test, we ran the BoostWeb Enterprise client on a Windows NT 4.0 proxy server running on a Pentium II 400-MHz box.

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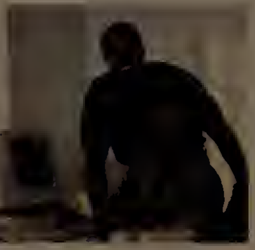

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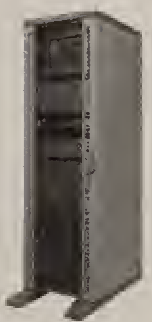

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Manage.Com puts XML to work

BY JEFF CARUSO

Manage.Com last week unveiled one of the first applications of Extensible Markup Language (XML) technology in management software — a tool that monitors transactions across firewalls.

FrontLine e.M provides a way for a company to configure devices, diagnose problems and measure performance — even if the gear resides on the other side of a firewall.

FrontLine e.M is intended to give an enterprise greater control over equipment used by business partners across an extranet. Naturally, a Manage.com customer's business partners need to grant permission to go through their firewalls.

While many vendors have talked about using XML for management, Manage.Com is actually using it in an innovative way in FrontLine e.M, says John McConnell, president of McConnell Associates in Boulder, Colo.

Just as HTML is a standard way of presenting a document, XML offers a standard way of presenting tables of information. When coupled with a database using the standard Common Information Model (CIM), XML opens the door for sharing management information across the Web.

Manage.Com's Web site will have a CIM database, called e.Registry, which will contain information about how to manage routers, switches and other devices. The database will also include rules for managing e-mail and other applications. Users of FrontLine e.M would subscribe to Manage.com's e.Connect service, which would let them access e.Registry via XML. The software downloads information from e.Registry about how to manage new devices.

FrontLine e.M can monitor specific services and ensure that they meet predefined service levels. If levels drop below an acceptable threshold, FrontLine e.M can find the cause of the problem and take actions to correct it. For example, if the software determines that a service is failing because there isn't enough disk space on the server that runs it, FrontLine e.M can be configured to free up space automatically.

The software includes a Web server at the user site that alerts net managers to problems and collects performance data over time to show trends. Java-based software agents are distributed to devices on a company's extranet and report performance problems to the server.

Manage.Com has focused its development efforts on Web-based management, creating software for mid-size companies. The new product is part of Manage.Com's plan to get an even narrower focus, managing electronic commerce transactions.

FrontLine e.M will ship in July, starting at $50,000. The price includes one year of e.Connect service.

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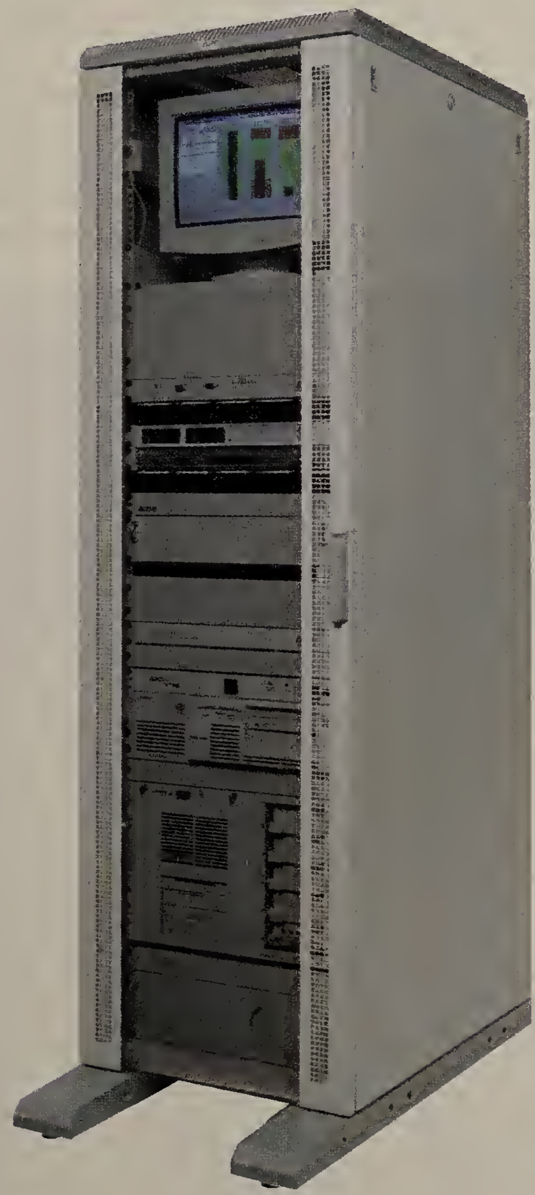

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'Net Insider . Scott Bradner

SHOULD I BE WORRIED?

AT&T is my long-distance phone company. MediaOne provides my cable TV and Internet services. Now it seems that I'll be getting all three services from AT&T as a result of the company buying MediaOne.

That in itself is not a reason to worry, but there are aspects of this acquisition that have me wondering. AT&T is paying about $4,700 per subscriber for MediaOne. The deal is the latest by AT&T in a year in which the company will spend almost $110 billion — just about twice its $53 billion revenue for 1998 — for cable TV companies. I sure hope AT&T will not try to recover all its $4,700 out of my cable bill next month.

AT&T wants to use the newly acquired last-mile connectivity to offer local and long-distance phone and Internet services without having to deal with the local Baby Bell telephone companies. I can easily see why any organization with half a clue would want to avoid depending on the Baby Bells to deploy any technology more sophisticated than a Princess phone.

Take a look at the mind-numbing slowness with which the Bells deployed ISDN service and the equivalent (at best) deployment strategy for digital subscriber line.

AT&T will face some significant regulatory issues. FCC chief William Kennard says the MediaOne deal "warrants very careful scrutiny." And according to the Federal Communications Commission, AT&T cable ownership will far exceed the maximum amount permitted by current regulations. But pundits seem to think AT&T will get past the hurdles after some pain.

AT&T may face other issues. For example, a bill was recently introduced in the U.S. House of Representatives that would require cable companies to open their infrastructures to competitive ISPs, as companies have already had to do in Canada. This would destroy much of the economic advantage of owning the cable infrastructure. There are also one or two killer technical hurdles that must be overcome to get reliable and reasonable quality telephone service over the cable TV infrastructure.

I have two additional concerns. AT&T has been planning to offer Internet service only through its relationship with @Home. I do not know how that will affect my, up to now, excellent MediaOne Internet service. I'm also considerably worried about the implications of the deal that AT&T has made with Microsoft to use Windows CE-based set-top boxes in 2.5 million homes. I want to have uninterrupted IP access to the Internet from my own computers, and I am far from sure that I can get that with Microsoft's "the PC is the home controller" philosophy.

If AT&T manages to get past the regulators and remembers to actually offer Internet service (rather than some other service through which the company defines the applications I can run) and telephone service, this could be a very good deal for us all.

Disclaimer: Harvard trains regulators in some areas and disdains them in others, but the above are my musings.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Public-key encryption for dummies

BY MIKE ROTHMAN

As the world increasingly turns to electronic business, electronic credentials that prove identity are becoming a critical necessity. Much like a passport proves identity in the offline world, public-key infrastructure (PKI) delivers a way to prove identity in the online world.

PKI is fast becoming the cornerstone of information security technology for a large number of companies.

PKI ensures that people are who they say they are and also proves that documents haven't been tampered with, which is critical when conducting online transactions, such as placing orders or transferring money. Here's a simplified look at these state-of-the-art passports to the online world.

The magic of PKI occurs through the use of extremely long prime numbers, called keys. Two keys are involved — a private key, which only you have access to, and a public key, which can be accessed by anyone. The two keys work together, so a message scrambled with the private key can only be unscrambled with the public key and vice versa. The more digits in these keys, the more secure the process.

Just as you prove your identity through a handwritten signature offline, you use a digital signature to prove your identity online. But without seeing a person sign the document, how can you prove it's the right person?

This is where public-key cryptography comes in. A large piece of data set to be encoded — for instance, a document — is run through a complicated mathematical computation to generate a single large number, called a hash. The original data and the hash are inextricably linked. If either changes, the hash won't match and the message cannot be decoded.

To digitally sign a document, a hash is taken of the document and then signed with a user's (let's call him Bob) private key. Data scrambled with Bob's private key can only be unscrambled with Bob's public key. Any entity can verify the validity of the document by unscrambling the hash with Bob's public key and checking that against another hash computed from the received data.

If the hashes match, the data was not tampered with and Bob's digital signature is on it. But because I didn't watch Bob sign the document, I don't know that it wasn't signed by an imposter. This issue is solved because only Bob has his private key, and so he is the only one who could have signed the document.

How do I know I have the correct key to verify the signature? This is where the concept of trust enters the system, creating the need for a certificate authority to verify online identity.

The certificate authority is like an online passport bureau — a trusted entity that makes the PKI system work. The private key is securely generated by Bob, and after verifying Bob's identity, the certificate authority signs Bob's public key with its own private root key. The combination of Bob's public key and the signature of the certificate authority completes Bob's digital certificate. Bob's digital certificate is his online passport, validated by the certificate authority's watermark.

Let's look at how all this works together in a simple transaction. Bob wants to send Alice a confidential e-mail. Bob would use Alice's public key, stored in her certificate, to scramble the message. When Alice receives the message, she uses her private key to unscramble it. Because no one else possess Alice's private key, only she can unscramble the message.

The process is similar in complex transactions. Let's say Bob wants to let Alice order products from his Web site. When Alice is ready to buy, Bob requests that she prove her identity. Alice signs the order with her private key, which was issued by a certificate authority we'll call TrustCo. She then sends the package consisting of the order and the digital signature to Bob. Bob needs to get Alice's and TrustCo's digital certificate to verify the signature. He validates Alice's certificate by verifying TrustCo's signature (remember TrustCo signs Alice's public key, thus forming the certificate), and then uses Alice's certificate to validate the signature on the order. If all those tests pass, Alice is actually Alice.

Like any security technology, digital signatures used in the PKI model aren't perfect. If the certificate authority's root key is stolen, then anyone can create digital certificates, which compromises the trust level of the certificate authority and makes all the certificates from that certificate authority null and void. Certificate authorities go to great lengths to keep their keys secure, including armored bunkers. Additionally, if Bob loses his private key, or if it's stolen, then anyone possessing the private key can pose as Bob.

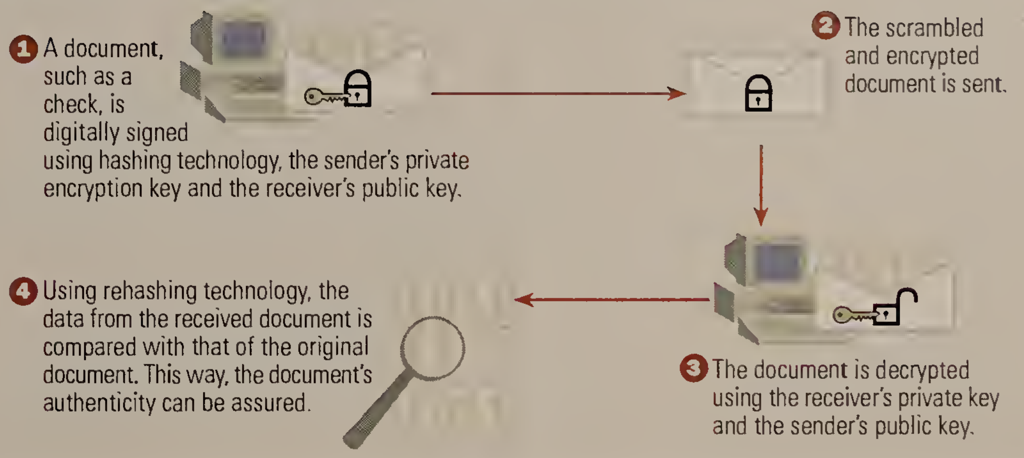
More importantly, thousands of applications used throughout businesses need to be PKI-ready. Applications need to know how to ask Bob to sign data and how to validate the data using certificates. For PKI to become a widely used technology, it must become a transparent part of everyday software, so end users don't need to understand all the complexity behind keys, hashes and digital certificates.

Rothman is executive vice president of SHYM Technology, a software company that makes PKI wares. He can be reached at mrothman@shym.com or www.shym.com.

HOW IT WORKS

Public-key infrastructure

Electronic business is picking up, and with it the need for secure electronic credentials is increasing. PKI is a way to prove identity in the online world. It also certifies that documents have not been tampered with.



❶ A document, such as a check, is digitally signed using hashing technology, the sender's private encryption key and the receiver's public key.

❷ The scrambled and encrypted document is sent.

❸ The document is decrypted using the receiver's private key and the sender's public key.

❹ Using rehashing technology, the data from the received document is compared with that of the original document. This way, the document's authenticity can be assured.

Ask Dr. Intranet

By Steve Blass

We have developed an intranet application using some of the newer features in Java 2. This applet runs under the Java Applet Viewer that comes with Java Development Kit 1.2, but it doesn't run in all our browsers. Can we ensure the applet will consistently run in the browsers?

Via the Internet

It sounds like the browsers' Java Virtual Machines (JVM) don't support all the Java 1.2 features you've used. You will probably need to use the Java Plug-in 1.2 to run the new applet. Sun provides free software to convert the HTML file that launches your applet so your browser will load the Java Plug-in 1.2 rather than use the built-in JVM. To install this HTML conversion program, go to http://java.sun.com/products/plugin and download Java Plug-in 1.2 HTML Converter. After unpacking the file "htmlconv12.zip" in a new directory, run the HTML converter from a system command line by typing "java HTMLConverter." This will launch a graphical user interface from which you can choose to convert one file or all the HTML files in a directory.

Choose the HTML files you wish to convert, pick the target browser from the dialog box and click "Convert." Your original HTML file will be saved to a back-up directory, and the new file written in its place. The result is an applet-launching HTML file that invokes the Java Plug-in 1.2.

As a network architect at Sprint Paranet in Houston, Blass understands the strain of developing and managing intranets. Send your problems to dr.intranet@paranet.com.

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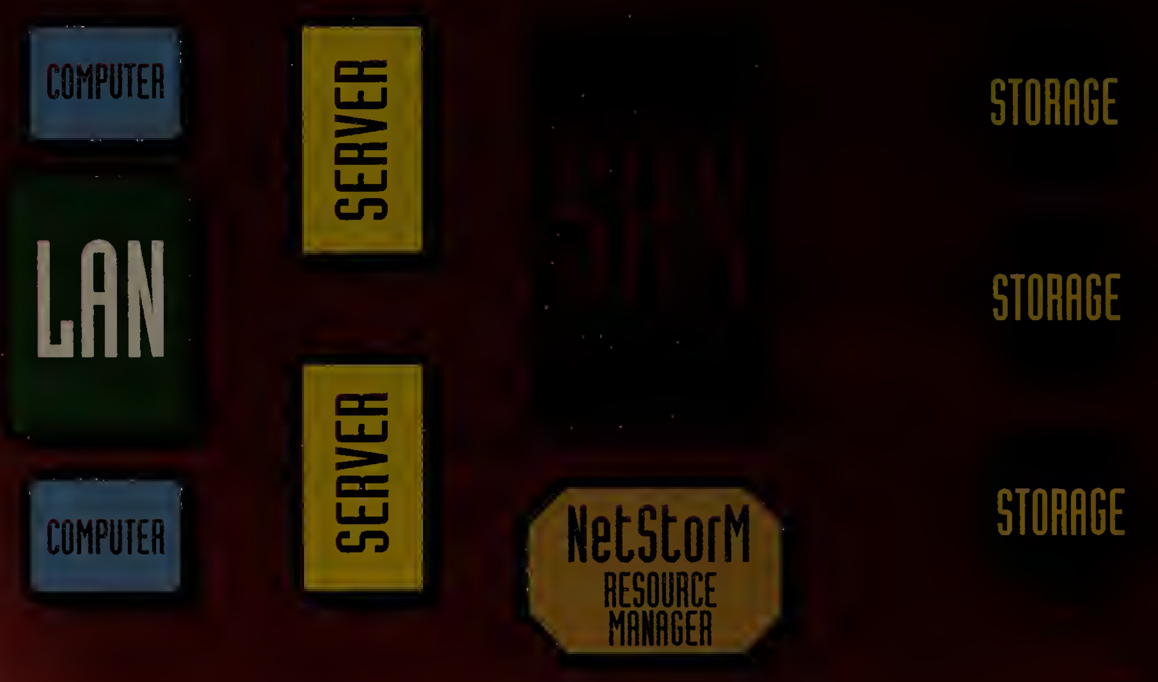

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Gearhead — inside the network machine . **Mark Gibbs**

GADGET HEAVEN: A PEN-BASED COMPUTER AND A DIGITAL CAMERA

This week Gearhead has got its sweaty hands on two way-cool toys, er, products.

The first is the Mitsubishi Amity XP computer. This is a pen-based, tablet-shaped computer with a price of around $3,000.

Measuring in at 10 by 7 by 1.65 inches and weighing 2.7 pounds with a single battery (you can have two installed at the same time), this is an acceptable package for walking around-type use.

These machines shine when work must be done at locations that aren't fixed and there's nowhere to easily use a laptop. For example, pen-based systems are very effective in hospitals and maintenance work or anywhere else that a pad of paper or paper forms would be used.

The Amity boasts a 166-MHz Pentium, 32M bytes of RAM (which can be expanded to 64M bytes) and a 1.6G-byte hard disk.

The display is a color, 8.4-inch, active-matrix LCD with 800-by-600-pixel resolution and a 256K palette. The display has two brightness settings and is very sharp with what appears to be a viewable angle of around 45 degrees.

The computer has built-in speakers (not loud enough), a microphone, USB port, serial and parallel ports, keyboard and mouse ports, yadda, yadda, yadda.

It also has a docking station with all those ports, built-in CD-ROM and floppy drives, a 10Base-T port and more yadda, yadda, yadda. You can peruse the specifications at your leisure at www.mitsubishi-mobile.com/products/pen/xp/pen_xp_main.htm. Suffice it to say, it's a very nice machine.

But it is the Amity's pen interface, combined with the small size, that Gearhead really likes. The pen digitizer uses a resistive touch, so the pen is merely a plastic stylus (which means that you don't have to worry about losing a $300 radio frequency pen and trying to find weird batteries for it when you're in Peewaukee in the middle of a blizzard).

The Amity uses the Handwriter Recognition System from Communication Intelligence Corp. (www.cic.com), which is one of the better handwriting recognizers.

The Amity is definitely one of the best pen machines we've used. That's not to say the unit is perfect. For example, to remove the Amity from its docking station you have to either shut the machine down or put it into suspend mode, both of which take longer than is desirable.

And if you get a blue screen of death, there's no "any key" to press, so you have to hit the reset button to force a reboot. We also suspect that the battery life is only around three hours despite sporting two 1350 mAh Lithium batteries.

But those minor irritations not withstanding, we were delighted to find that the Amity has a USB port. That meant that we could plug in our other toy, the Compro PS39 Digital Video Camera from ACS Innovations International (www.acscompro.com).

This is a really cool color camera that can capture still images up to 1280 by 960 pixels in 16.8 million colors or video at up to an amazing 40 frames per second (for small image sizes only). For those without USB, ACS offers a parallel port version, but you won't get the high frame rates.

We tried the camera with a desktop machine as well as the Amity and the results were equally good. Microsoft's NetMeeting 2.11 conferencing software works with the PS39, but the NetMeeting 3.0 beta couldn't see any video devices at all.

This is also a great way to roll out videoconferencing in your organization — the simplicity and performance for the price ($130) make videoconferencing much easier than it has ever been.

Next week: More business products (ahem) you absolutely need.

What toys do you play, er, work with? Diversions to gearhead@gibbs.com.

Network World Fusion Spotlight

News, tips and tools from our Web site

A changed InteropNet

A number of grizzled NetWorld+Interop 99 veterans reacted to our story last week on how the show network had been split into a production network and an experimental one.

Writes one veteran: "I was part of the InteropNet Team in Atlanta 1995 and Las Vegas 1996. It is sad to hear this news. I feel both proud and fortunate that I had the opportunity to participate in the InteropNet team when it was truly that — an Interoperability Networking Experience."

Another reader was more critical: "I feel kind of cheated because I have never attended the old Interop and planning on attending the one next year. Now, maybe not . . ."

See what others had to say — and join in with your thoughts on last week's show.

DocFinder: 2930

Can I say hi to my mom?

Speaking of NetWorld+Interop, last week us pixel-stained wretches here at Fusion experimented with some live broadcasts from the show.

White Pine Software set us up with CU-SeeMe stations at the show and back at stately Fusion Manor in Framingham, Mass.

If you missed these pioneering reports, don't worry — we recorded them for posterity. Find them, along with a report on how it all went, at:

DocFinder: 2931

Foo' Bar: A digression

What do Alan Greenspan, Wall Street and the Web have common? Find out this week in the latest installment of the world's best Web development column, by the techie geeks at The Motley Fool.

DocFinder: 2934

Nutter's Help Desk

This week, Ron Nutter helps out a reader who wants to install a larger hard drive on a NetWare 3.12 server.

The system doesn't seem to want him to expand from 570M bytes to 3.2G bytes.

Maybe it's afraid that means extra work? See what Nutter has to say at:

DocFinder: 2929

Career Doctor

OK, you've accepted the job, now what?

Career Doc Shaun Kelly opens his black bag and writes a prescription for minimizing the new-employee learning curve. See what he recommends at:

DocFinder: 2463

VPN tips

When Dave Bixler, an IT core technology service manager, deployed his firm's second-generation virtual private network (VPN) in January, he didn't anticipate having a problem that would be beyond his control. But no matter what he did, the VPN kept getting congested.

Read what Bixler finally did, and pick up tips from other seasoned VPN veterans. And if you have questions of your own when you're done, hop into our VPN Tips forum. There, you'll find VPN reviewer Joel Snyder's answers to user VPN questions.

DocFinder: 2933

Help Desk

Ron Nutter is standing by to answer your networking questions. Read his column every week on Fusion. DocFinder: 2450

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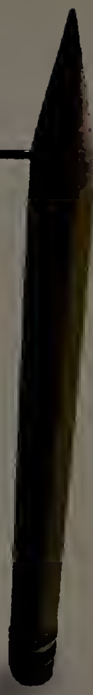

Editorial Insights

Parting advice

With no small amount of mixed feelings, after nearly 11 years I'll be leaving *Network World* May 28 to join my brother in forming a new publishing company. Our editorial director, John Gallant, gave me the opportunity to fill this space this week, suggesting I might write a swan song. (The fact that I was one of the few editors not attending NetWorld+Interop had something to do with it, too, but nevermind that.)

I decided to use the opportunity to raise an issue that I've always felt strongly about but didn't feel comfortable raising, for fear that doing so would come across like so many sour grapes. Now that I no longer have a real vested interest in the issue, I hope that won't be the case.

The issue is the reluctance of some in the user community to interact with members of the trade press. I understand the reasons behind it — those we hear most often are that it's corporate policy and there's a fear of being misquoted or of irritating a key vendor.

That's unfortunate because we can help you help yourselves; in fact, that's what makes our jobs gratifying. We have access to vendors, to testing facilities and to analysts that some of you don't have, or for which you would have to pay a lot of money. We can help you get your questions answered. We can raise your profile in the industry by quoting you in stories and putting you on conference panels.

And we're giving you new avenues of communication and, in my opinion, more useful offerings, most notably by using the Web. Just check out the various forums on Network World Fusion and offerings such as RFP Central, where we get vendors to respond to your request for proposal. Earlier this month, 11 vendors responded to one reader's virtual private network RFP (www.nwfusion.com, DocFinder: 2823).

I can't guarantee you will never be misquoted or that some vendor won't one day be upset by something you say in print or online. But in the long run, you can be reasonably certain you'll be better off for having participated in the process.

In my new position, I'll be producing custom publications for vendors and probably some content for conferences. In these capacities, I hope to continue to educate users about technology. I can only hope to do it half as well as I think the staff here at *Network World* does. I will miss them. You shouldn't.

Thanks all for a great 11 years.

— *Paul Desmond*
Features editor
pdesmond@nww.com

Message Queue

GREED, NOT GRIEF

Regarding Mark Gibbs' "Backspin" column on the ludicrousness of blaming computer game makers for the high school shootings in Colorado and Kentucky ("Blaming the business," May 3, page 82):

As a former Army officer who attended a Special Forces school that taught how to use firearms to remove the enemy from rooms and buildings (a la "Doom" and "Quake"), I can't figure out how those games would teach anyone to effectively aim and shoot a weapon. Effective shooters develop muscle memory by repetitively raising, aiming and firing real weapons.

No matter how good you are on a keyboard or joystick, the real thing is quite physically different. I don't know how the Marines use "Doom," but I suspect they use a modified version to train tactics rather than the physical skills of shooting. I smell more greed than grief in these lawsuits.

Ed White
IT security administrator
Mayor's Office of Information Services
Philadelphia

IT'S CRIMINAL

I disagree with John Martoccio's letter to the editor claiming that Microsoft bears the greater responsibility for the effectiveness of the Melissa virus ("The real villain," April 26, page 40). Yes, I dislike how Microsoft has tied various software applications together such that this type of attack was successful. However, I do not think that we should applaud Melissa's creator, David L. Smith, or any virus creator. Smith should be dealt with the same as any criminal because he stole system productivity and man-hours from those of us who were unlucky enough to be victims of this virus. This does not include the lost sales due to some companies having to shut down their mail servers to rid them of the Melissa infection.

The case of Robert Morris Jr. provides a perfect precedent for throwing the book at Smith. What Morris did by accident through poor programming, Smith did on purpose. People must take responsibility for their actions.

Kenneth Grossman
Alexandria, Va.

STILL GOING

I was a bit surprised by Ewin Barnett's letter to the editor boasting about a VMS system that has run reliably without rebooting for more than 120 days ("Viva VMS," April 26, page 40).

My company uses Windows NT for our database needs and has developed an Internet demographics collection and caching software package. The server running the software hosts an average of 500 Internet sessions per day and performs an average of 180,000 database transactions per day. When it's not loaded down with database transactions, it's busy collecting information from 40 to 50 information servers.

This server ran for six months, the first three with an average of 70% processor usage, and the last three with 100% usage. We had to stop the server in order to move it to our new office. I'm sure many companies depend upon their Unix servers the same way we depend upon Windows NT.

Peter Cooper
Programming manager
MediaHouse Software
Quebec

FEELING LEFT OUT

We at International Network Services (INS) were very disappointed to be omitted from this year's Network World 200 (April 26, page 43).

INS has been recognized by Deloitte & Touche an unprecedented three straight years as the fastest-growing network services company in the U.S. in terms of revenue, profit and number of employees. In March, The Yankee Group named INS the leading consulting company in the high-tech market, over more prominent names in the industry such as Andersen Consulting, KPMG, EDS, Comdisco and Wang Global.

We recommend that *Network World* carefully reexamine the selection criteria.

Jeffrey Kaplan
Director, strategic marketing
INS
Quincy, Mass.

Send letters to nwnews@nww.com or John Gallant, editorial director, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

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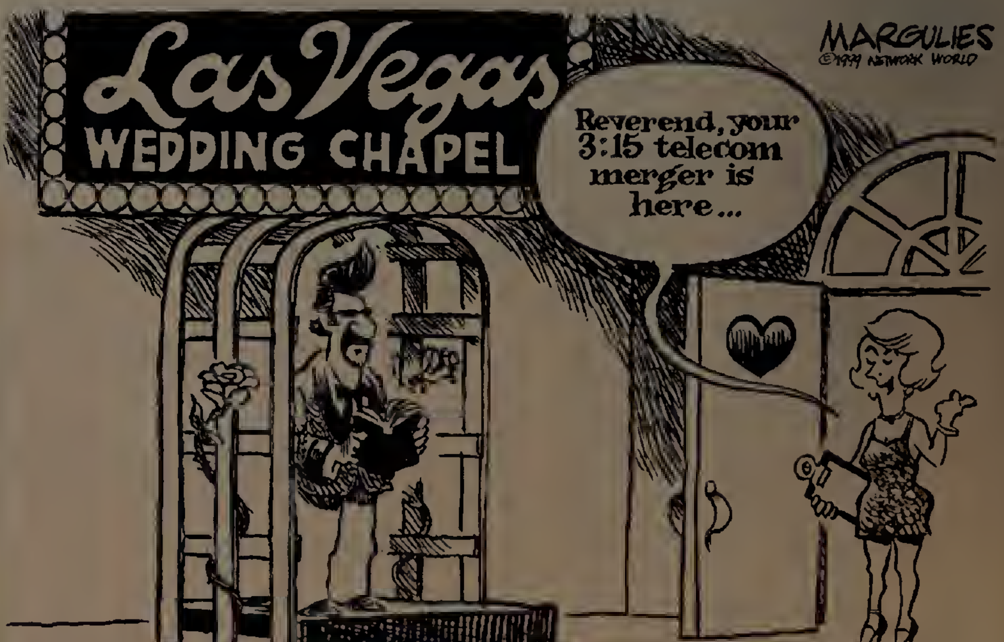

The Internet . Wayne Spivak

WHOIS: A PARADOX OF PRIVACY VS. PUBLIC NEED

Ever since Tim Berners-Lee created the browser-editor and the Web, the Internet has truly become a web of intrigue. One particularly intriguing area is the ethical question of privacy vs. the right to use the Internet as a legitimate business tool.

Two years ago, I wrote a column about how the Whois database was open to data mining — the adverse use of information gleaned from the database. In late 1997, Network Solutions, Inc. (NSI) finally addressed the openness of Whois by slowing the pace at which the database will reply to repeat inquires from a specific IP address. However, this did not stop the data mining.

In September 1997, a company named Domainsondisc announced it had harvested "practically all registered .com, .net, .edu and .org domain names" on the Internet. For $999.95 plus shipping and handling, the company was selling a CD containing all administrative, technical, billing and address information for these registered users, including their e-mail addresses. Shortly after the announcement, due to strong negative comments from the Internet community, Domainsondisc pulled its product.

Fast forward to September 1998. Domainsondisc claims to have more than 3 million domain names for sale. This time, however, the CD the company is selling does not include these registered users' e-mail addresses. Why? Because Domainsondisc does not want to propagate unsolicited e-mail. But apparently the company doesn't have a problem propagating nonstop telemarketing via phone and fax.

In the snail-mail world, the Direct Marketing Association has specific policies regarding use of an individual's address. Unfortunately, we don't have a similar presence on the Internet — yet.

The Internet needs to remain free and unencumbered. However, the right to privacy must be weighed against the freedom to use the Internet as a communication tool for conducting legitimate business.

Is there a solution to this paradox?

Chris Clough of NSI said a few months ago: "We need to go back to original intent of Whois, which was for the technical contacts to be able to work with each other to fix problems. The technical community needs the ability to contact each other, so some information must be available, but we want to limit the information so that spammers will not use the database."

Additionally, NSI is looking into such issues as an "opt-out" policy, which would presumably limit what information is listed in the database.

I know one solution that did work and will work again. Voice your disapproval to these "marketeers" and those who follow them by sending comments to www.domainsondisc.com, the Internet Society (www.isoc.org) or the Coalition Against Unsolicited Commercial Email (www.cauce.org).

Internet users shut down Domainsondisc once; they can do it again.

*Spivak is president and owner of SBA*Consulting, an IT consulting firm, and SBA.NET.WEB, an Internet consulting company. He can be reached at wspivak@sbanetweb.com.*

Reality Check . Thomas Nolle

HOW THE FCC MAY HAVE SAVED THE CLECs

Last year, in a response to the regional Bell operating companies' request to exempt advanced services from competition, the Federal Communications Commission proposed a new set of rules that might have driven many competitive local exchange carriers (CLEC) out of business. This year, the FCC may have saved the CLECs — or at least some of them — from extinction.

The most important ruling in the telecom act is the requirement that incumbent facility-based carriers, such as the RBOCs, wholesale the elements of their infrastructure to competitors. Last year, the RBOCs asked the FCC to exempt advanced services such as digital subscriber line (DSL) from this requirement, citing the FCC's obligation under Section 706 of the act to further advanced services.

The FCC refused but suggested the RBOCs consider forming separate CLEC subsidiaries to offer advanced services. These subsidiaries would not only be exempt from wholesaling, but could also buy RBOC voice services at wholesale prices and sell them at retail rates just like any other CLEC. This would eliminate a lot of the CLEC price advantages, possibly driving many out of business.

The FCC's latest round of rule-making leaves the RBOCs hanging on the issue of the separate CLEC subsidiary and provides CLECs real opportunities in the very area where the RBOCs sought FCC protection — xDSL.

According to the FCC ruling, the incumbent LECs (ILEC), including the RBOCs, must:

- Permit any sort of digital loop technology that is based on international standards or has been deployed in other RBOC areas.
- Permit the co-location of switching technology used to interconnect the unbundled network elements that the CLECs wholesale, thereby allowing the CLECs to add value to their xDSL offerings.
- Submit to rigid inspection of co-location space options in each central office and provide space in alternative locations if space runs out.

In addition, the FCC proposed the ILECs be required to wholesale not only copper loop, but also digital spectrum space on the same copper loop used for basic telephony. Consequently, a CLEC could wholesale only the xDSL portion of a loop, leaving the incumbent to provide analog voice services on the remaining spectrum space. Moreover, many xDSL providers could dodge the expensive option of providing voice services.

All of this is designed to let CLECs exploit the most valuable asset they can wholesale from ILECs: copper access to the customer. The question is: Will the CLECs follow the FCC's lead?

There are powerful forces driving the CLECs to exploit copper loop in creating their own advanced services. Competition from cable companies could siphon off most of the residential xDSL opportunity if both the CLECs and ILECs sit on the sidelines. Even a short delay in deploying xDSL would mean that many of the best Internet access or corporate telecommuter prospects would be committed to alternative means of network access, such as cable.

There are also powerful forces inducing the CLECs to sit on their hands and wallets. Building infrastructure exposes CLECs to significant costs in equipment and technology skills. It might take a year or more for RBOCs to enter the CLEC space, even if the FCC moves quickly to solidify the requirements for RBOC/CLEC subsidiaries. During this year, a CLEC focusing on simply wholesaling service from the RBOC and retailing it to users can rake in the bucks with no investment to speak of.

Equipment vendors face a similar dilemma. Should they jump in to support a new class of switching-enabled Digital Subscriber Line Access Multiplexer (DSLAM) products designed to empower the new-age CLEC with facilities-based data services? If they do, they could sit without customers for a year while the RBOCs consider their options. If they don't, they could leave what might be an exploding equipment market to others.

According to FCC rules, new DSLAM products have to offer advanced switching/routing features to add services to xDSL. But it'll be up to the CLEC or RBOC to decide whether these features will be used.

Inevitably they will be used because this is do-or-die time for the CLECs. The FCC has offered them a set of rules that brush aside stalling tactics the ILECs have used to inhibit xDSL. The commission also has given the CLECs a warning: Wait too long and we'll open the CLEC market space to the RBOCs themselves.

The winners in this process could be xDSL users. Better data features in DSLAMs, and a more competitive local access market to push those features, could bring higher-quality, lower-cost xDSL services to users.

It's about time.

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or tnolle@cimicorp.com.

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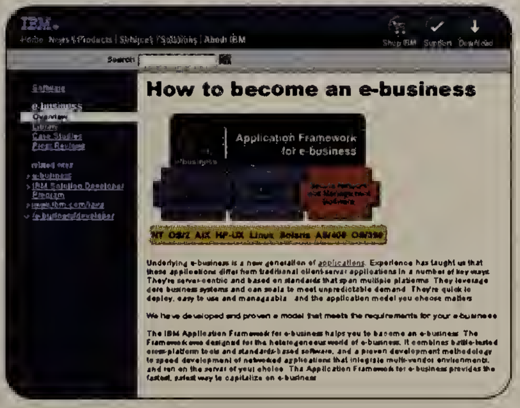
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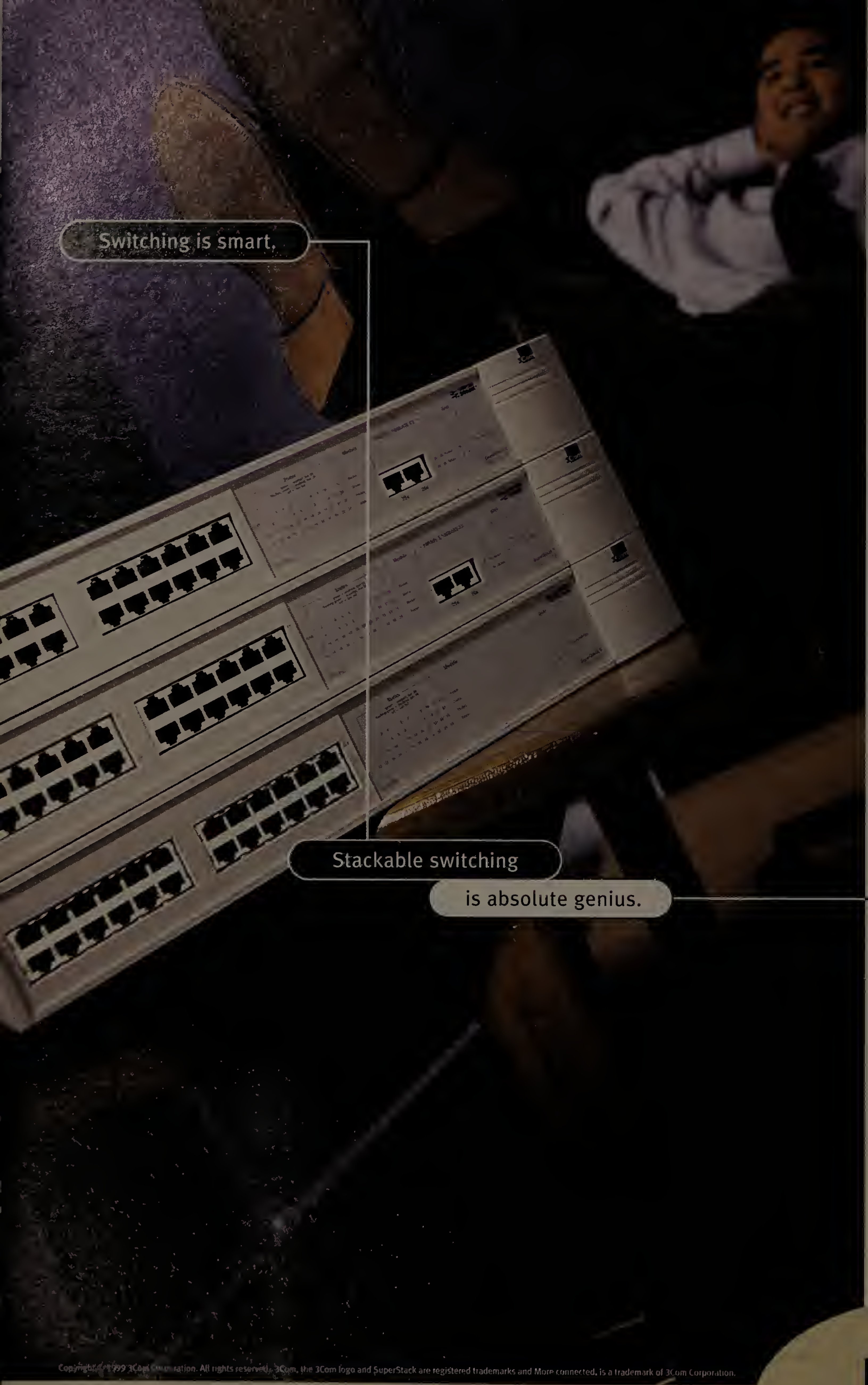

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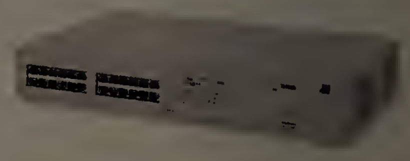

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CALL CENTERS FIND PROFIT IN THE 'NET

Web access, voice over IP and speech recognition pose integration challenges but can mean major savings and increased revenue.

BY KIMBERLY PATCH
AND ERIC SMALLEY

Call centers are accepting faxes and e-mail messages and are adding chat capabilities to become "contact centers." Contact centers, in turn, are merging with Web sites and marketing databases to become the centerpieces of customer relationship management systems. Network managers, naturally, have to take on the integration challenge to make it all happen.

There are many questions to be answered. Do you place all types of contacts in one queue? Do you go with call-through or call-back buttons? Should you replace your interactive voice response (IVR) system with speech recognition technology?

Contact cost breakdown

The average costs for typical customer contacts to a call center, including agent's time and call center infrastructure are:

Live operator:	**$10**
IVR or speech recognition:	**$6**
E-mail or fax:	**$3**
Web self-help:	**$0.50**

Add 6 to 12 cents for each minute a customer is on hold on an 800 line.

SOURCE GIGA INFORMATION GROUP, CAMBRIDGE, MASS

But this integration is the kind of challenge that, handled correctly, can have a significant impact on a company's bottom line. All-encompassing call centers can cut costs, most notably by improving the efficiency of call center agents. Call centers can also increase customer loyalty and boost sales if you take the time to think through the various ways your customers will be contacting you and arrange access accordingly. Woe to the company that fails to properly integrate its call center with its Web site — your agents can expect some nasty feedback if customers are asked to repeat steps they've already taken online.

The past year and a half has witnessed a boom in products and services aimed at adding fax and e-mail as channels into customer service, sales and help desks. Companies such as Lucent, WebLine Communications, Edify, IBM's Corepoint Technologies and Genesys Telecommunications Laboratories are all addressing the issue. Automated call distribution systems now route fax and e-mail "calls" with traditional voice calls to contact center agents. Companies can set priorities based on the type of channel from which a call is received or dedicate a set of agents to handle contacts from a specific channel, such as e-mail.

Mike Burroughs of Phillips Publishing says to use Web site call-back buttons with caution — first get your call-back policies down and make sure the design of your site is foolproof.

Companies are beginning to provide more detailed customer service through their Web sites, in particular by making it easier for customers to find information themselves. Today, the market for software that provides customer service via Web sites is about $25 million. By 2002, the market should reach $658 million, according to David Cooperstein, a senior analyst at Forrester Research.

Companies will save an average of 43% per contact by implementing Web-based customer service — even with an average increase of one-third more contacts over the next two years — because an increasing percentage of contacts will be self-service, Cooperstein says (see graphic, left).

Tying in the Web

The last year or so has also brought a proliferation of tools aimed at integrating Web sites and contact centers. Queries from Web sites need to be handled differently from those received via fax and e-mail, which are usually fairly simple. When a customer queries a company through its Web site, contact center agents need to know the context surrounding the query — not only what's on the Web site, but also from where in the site the customer has made contact. When agents don't have this information, customers can perceive the quality of service through the Web site to be lower than through other channels.

"Our Web presence is an additional channel by which the agent can service the client. It's really critical to us that the customer's experience is consistent across all of the points of contact," says Michael Batt, marketing director of Merrill Lynch Online in Princeton, N.J.

There are three types of integration between Web sites and contact centers. The simplest is Web-based chat, in which contact center agents engage customers in typed chat sessions using tools from companies such as Live Response. But with chat alone, agents don't know where customers are in the Web site. That ability requires the next form of integration — tracking, with tools from companies such as BroadVision and Inference Corp.

An even higher level of integration is shared browsing, or page pushing, which requires tools from companies such as HipBone Software and WebLine. These tools allow an agent and customer to navigate the Web site together, seeing the same pages at the same time and sharing the cursor so either can initiate a move to another page.

Web chat costs $2,000 to $2,500 per agent to implement, according to James Mitchell, chief technology officer of Davox Corp., a call center hardware and software vendor. A mid-size call center with 50 to 100 agents can expect to pay $4,000 to $5,000 per seat for a Windows NT system that supports access by fax, e-mail and Web site, as well as call switching, screen pops and back-end computer-telephone integration (CTI), Giga's Landoline says.

Integrating Web sites into contact centers improves service by giving customers an additional channel to agents and by better informing agents about customers' needs at the beginning of a contact. Better-informed agents reduce costs because their talk time is shorter, allowing fewer agents to handle the same number of contacts. As more companies take this tack, it will increase the pressure on the competition to do the same or risk losing customers.

Perhaps the most enticing benefit of integrating Web sites and contact centers is increased sales. Computer maker Micron Electronics has integrated its Web site with its call center using Lucent's Internet Telephony Server (ITS).

"The leads are already qualified because they're on our Web site. We know where customers are on the Web site so we know what they're interested in," says Jim Jacobson, who until last month was director of IT development for Micron Electronics.

Micron's agents not only know where customers are in the Web site, they are also able to push pages to customers, in effect steering them around the site. Jacobson has proof the strategy works, noting that 50% of calls that come in from the Web site result in sales, compared with between 20% and 30% for standard telephone calls.

And there are other benefits. "Our average selling price per transaction is higher on the Internet, and it's cheaper for us to do business on the Internet," Jacobson says.

Many integrated Web site contact centers use call-back buttons, or fields where customers can type in their telephone numbers to have agents call them back. The purpose of call-back buttons is simple: to reel in the customer before he changes his mind or surfs elsewhere. However, call-back buttons can present policy and procedure challenges.

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Here's a sampling of companies whose products can help you create a call center that can do it all. We've established links to each company on Network World Fusion:

- **BroadVision** (www.broadvision.com) — Web tracking
- **Corepoint Technologies** (www.corepoint.com) — Contact center software
- **Davox** (www.davox.com) — Contact center hardware and software
- **Edify Corp.** (www.edify.com) — Contact center software
- **Genesys Telecommunications Laboratories** (www. genesyslabs.com) — Contact center software
- **HipBONE Software** (www.hipbone.com) — Shared browsing tools
- **IMA** (www. imaedge.com) — Contact center software
- **Inference Corp.** (www.inference.com) — Web tracking
- **Lernout & Hauspie** (www.lhsl.com) — Speech recognition
- **Live Response** (www.liveresponse.com) — Web chat
- **Lucent** (www.lucent.com) — Contact center hardware and software
- **Nuance Communications** (www.nuance.com) — Speech recognition
- **SpeechWorks International, Inc.** (www.speechworks.com) — Speech recognition
- **WebLine Communications** (www.webline.com) — Contact center software, shared browsing

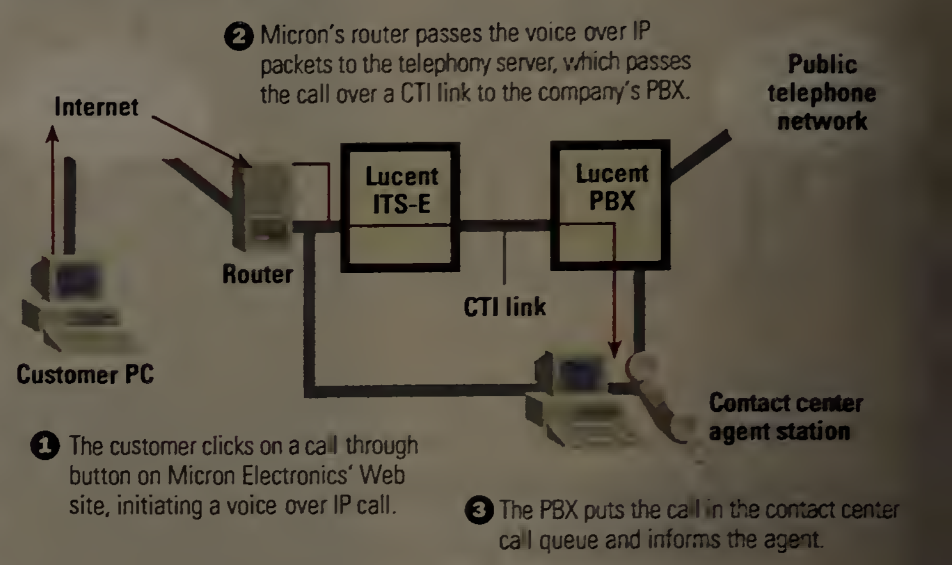
"You've got to be very clear in communicating when to expect the call back," says Mike Burroughs, vice president of operations for Phillips Publishing of Potomac, Md. "If your call center is going to be e-mail intensive and inbound-call intensive, it creates a challenge for call center managers because now what you're talking about is a form of call blending." Call blending is the practice of having inbound and outbound calls handled by the same call center, a practice he says has worked well for only a few industry segments because the two types of calls require the agents to have different skills and incentives.

Talk to me — the Web as telephone

Phillips is integrating e-mail into its contact center via IMA's Edge multichannel contact center software and is planning to integrate its Web site, Burroughs says. As part of the plan, the company is considering call-through buttons, which let customers speak directly to an agent through the Web site, he says.

Calling Micron — via the Internet

Micron Electronics' contact center supports voice-over-IP calls via Lucent's Internet Telephony Server.



❷ Micron's router passes the voice over IP packets to the telephony server, which passes the call over a CTI link to the company's PBX.

❶ The customer clicks on a call through button on Micron Electronics' Web site, initiating a voice over IP call.

❸ The PBX puts the call in the contact center call queue and informs the agent.

Call-through buttons use voice-over-IP technology to allow customers to call agents directly from within a Web site. When an Internet chat or voice call is routed to a Micron agent, for example, an automated voice tells the agent the call type, and the Web page from which the customer is calling pops up on the agent's screen, Jacobson says.

The idea of a call-through button is the same as it is with call-back buttons: to generate a contact at the moment of interest. Call-through buttons have an advantage over call-back buttons because they don't require consumers to have a second telephone line.

However, voice-over-IP technology is still maturing. The quality of voice over IP still lags behind traditional telephony, which could be a liability. Micron has experienced relatively low-quality connections with voice over IP, Jacobson says.

"It's like talking to China," he says.

Also, few people are using voice over IP. The majority of Internet calls to Micron's contact center have been chat because relatively few people have microphones on their PCs, he says.

Talk to my server — the telephone as Web browser

The ultimate goal of technology is automation, which replaces higher-cost human workers. Automation will hold labor costs at the current level of 67% of all call center costs in the face of increased traffic from e-mail and Web sites, says Joe Outlaw, a research director at Gartner Group in Delran, N.J. Network services account for 18%, equipment 8% and facilities 7% of call center costs, according to Gartner Measurement, a division of Gartner Group.

Speech recognition technology, implemented as an upgrade to IVR systems, can significantly reduce the number of calls that go through to contact center agents. Several companies, including Nuance Communications, SpeechWorks International and Lernout & Hauspie, provide speech recognition software for contact centers.

With speech recognition technology, customers ask questions over the telephone, the questions are converted to database queries and the responses are read back to customers using a synthesized voice. Companies are using speech recognition to allow customers to access data directly rather than having human agents fetch the data for them. Several brokerage firms, including Charles Schwab and Fidelity Investments, use the technology to allow customers to make financial transactions.

Speech recognition systems are a significant improvement over touch-tone IVR systems because users direct the interaction. "The likelihood of people using an automated system goes up significantly when they are in control," says Steve Ehrlich, vice president of marketing at Nuance.

The more people use automated systems, the greater the savings for the company. From 40% to 45% of callers "zero out" of traditional IVR systems and immediately talk to agents, Giga's Landoline says. Advances such as speech recognition should reduce that figure to about 20% in the next couple years, he says. Speech recognition also costs 30% to 40% less per call than IVR, he says.

A simple speech recognition application that recognizes digits costs around $250 per line, applications that allow customers to perform a series of transactions cost between $500 and $1,000 per line, and high-end applications that feature full natural language processing cost around $3,000 per line, Nuance's Ehrlich says.

Speech recognition technology also offers a greater degree of security. Financial services companies in particular are interested in using speech recognition for the added benefit of user authentication via voice prints. Voice authentication adds $200 to $300 per line, Ehrlich says.

Human factors and pitfalls

Integrating Web sites with contact centers can change the experience of not only customers, but also of agents. Web-based and speech recognition self-help systems reduce the number of repetitive, routine inquiries that agents have to handle. Less drudge work improves job satisfaction, which reduces contact centers' typical 25% to 30% annual turnover rates, Landoline says.

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But Web site-contact center integration also brings human resources challenges. Agents will need to know not only the content of the Web site, but also its format and layout, which entails additional training. Organizational challenges can also arise, given that contact centers and Web sites are typically staffed by different departments.

There are plenty of technical pitfalls lurking for IT staffs, as well. Network managers need to be prepared for changes in network traffic and bandwidth use, particularly for scenarios in which large numbers of customers use voice over IP simultaneously, says Rick Favro, vice president of global customer care solutions for MCI Systemhouse in San Francisco.

The design of a Web site has implications for Web site-contact center integration. With Web-based forms, the information about where a customer is at any point in a transaction is more detailed than simply what page they're on at the time, Favro says. For example, if a customer needs help at some point in a single long form, the agent will have little idea where the customer is on the page. But if the customer needs help in one of several shorter forms spread across different Web pages, the agent can zero in on the problem more quickly.

Also, call-through buttons can become a costly replacement for good Web design if customers become lost in a Web site and use the buttons only to call live agents for help, according to Phillips' Burroughs.

Organizing content for speech recognition systems is another challenge because voice user interface design is relatively new. "The common mistake might be to say, 'OK, I've got this Web page. Let me just imitate it over the phone,' " Nuance's Ehrlich says. "That is a recipe for disaster because people do not speak in the same way that they read." For example, Web pages can present users with a lot of information at one time, whereas speech-based voice response systems require smaller increments of information to pass back and forth between the user and the system.

When turning call centers into contact centers and integrating contact centers with Web sites, the best advice is go slow or go with an integrator. IT staffs handling the project on their own should take it one step at a time, making the business case for each piece of the project before considering the next. Integrating e-mail into the contact center should be the first step. And when integrating Web sites with contact centers, IT staffs should focus on tracking and chat functions before worrying about call-through or call-back buttons.

About 40% of the average call center integration project is custom development work because of the prevalence of legacy systems, Giga's Landoline says. This makes a good case for going with an integrator, especially for older terminal-based call centers that require upgrades to PCs and networks.

Many businesses should be able to make a case for shifting much of their contact center traffic volume to self-help systems to cut costs, boost sales or at least be prepared for the increase in traffic volume from multichannel access. The integration effort will also make it easier for businesses to implement different classes of customer service based on the perceived value of the customer rather than the channel by which the customer is communicating with the company.

As Jacobson says, "It's all about generating calls and generating efficient calls."

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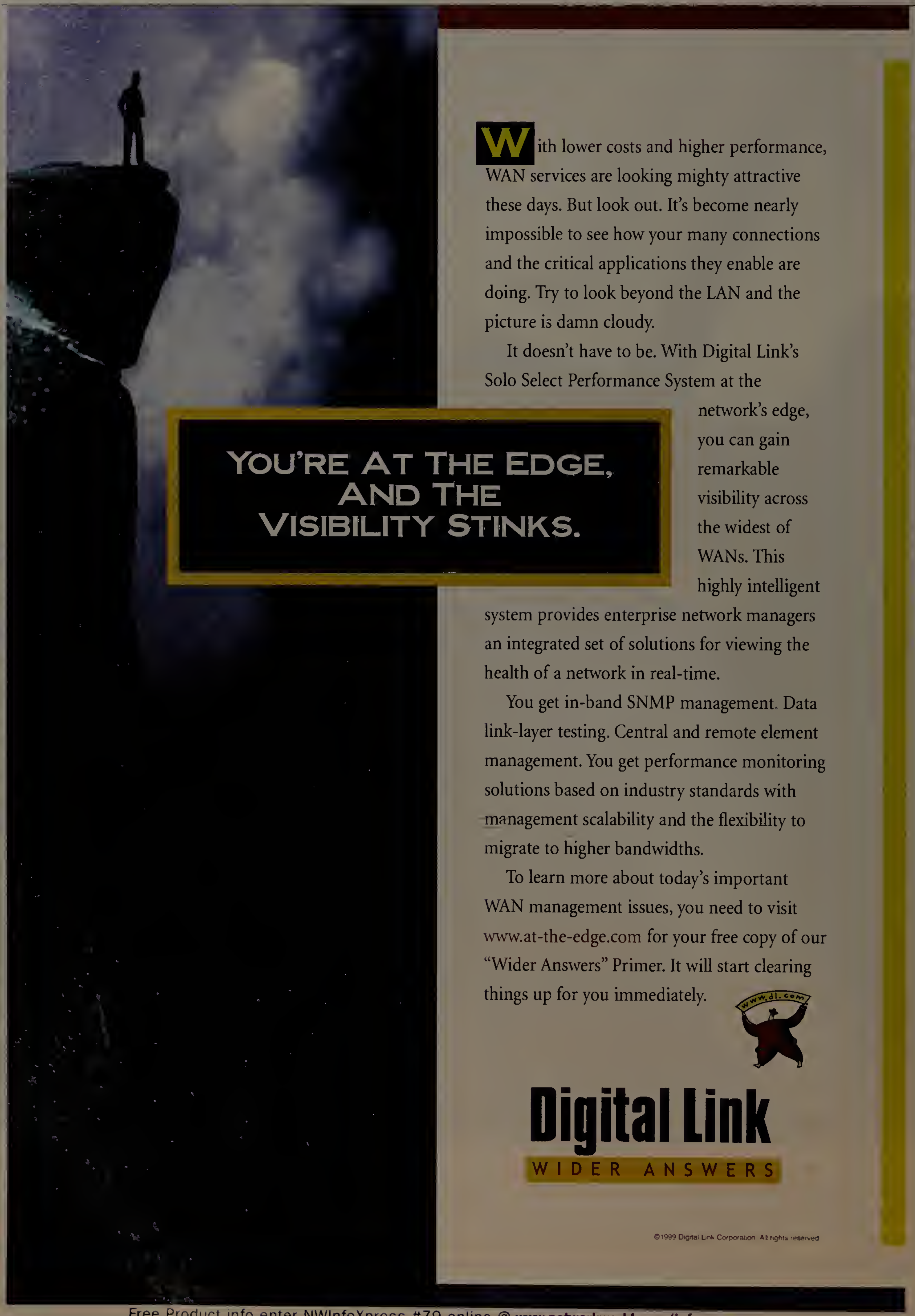

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ROAMING ABOUT CAMPUS

BY NEAL WEINBERG

Florida law school uses wireless technology as a key differentiator.

FT. LAUDERDALE, FLA. — It's a spring morning, and first-year law student Yashmin Alexis is registering for her fall classes at Nova Southeastern University. No, she's not standing in a long line at the registrar's office. Rather, she's sitting in the school cafeteria entering her course preferences over the Internet from her laptop.

Alexis isn't alone. At tables scattered across the cafeteria of the Shepard Broad Law Center, students have their faces buried in computer screens as they access a variety of applications over the law school's wireless LAN. In nearby classrooms, most students are furiously typing lecture notes. Students hanging out in the lounge balance portable computing devices on their laps, and one student climbing stairs is intently focusing on a laptop balanced in her palm.

Nova Southeastern may not match up with Harvard or Yale when it comes to history and prestige, but the law school is trying to make up for its lack of pedigree with a technology focus. Students must buy laptops outfitted with wireless adapters so they can connect to a wealth of Internet-based applications from anywhere on campus.

The National Jurist magazine recently named Nova Southeastern as the "Most Wired" law school in the country, a designation that quickly found its way into the school's marketing materials.

Dean Joseph Harbaugh has been leading the technology charge since he took over in 1994. "Lawyers are information managers for clients," he says. Lawyers need to understand how to use computer technology to gather information from multiple databases, to manage case files and even to bill their hours.

Harbaugh says Nova's emphasis on technology enhances the learning experience, makes a great recruiting tool and helps graduates win jobs. "It creates an atmosphere which sets us apart," adds Associate Dean Paul Joseph.

Of course, the move to create a wireless LAN in the law school building was not without its practical considerations. When Harbaugh came on board, the school had a 24-station computer lab for more than 800 students. Rather than pour money into new hardware to expand the computer lab, he decided to invest in a new network infrastructure to support increased computer use by students, faculty and administrators.

But the law school was built six years ago with solid concrete floors and a single data port per classroom, and it would have cost almost $600,000 to rewire the five-story building. Moreover, the school operates year-round and couldn't accept any downtime, according to Billie Jo Kaufman, law library director.

For about $80,000, the school went wireless. It installed 33 RangeLAN 2 series radio frequency transceivers, or access devices, in the drop ceilings above classrooms, the cafeteria and the library. Beginning in fall 1997, first-year students were required to buy a laptop and a $400 RangeLAN 2 wireless adapter. The $3,000 price tag is included in each student's tuition bill, so it can be part of a financial aid package.

There were skeptics at the school who doubted whether wireless technology would work properly, Kaufman says. But after a trial run with the equipment, which is made by Proxim and resold by Amp Corp., the school "jumped in and did it," she adds.

Key components

Hardware: Dell Latitudes with 1.6M bit/sec Proxim RangeLAN 2 wireless adapters and two four hour batteries.

Servers: Dell PowerEdge 6300s

Software: Windows NT, Outlook/Exchange, Internet Information Server, Microsoft Access and Allaire Corp.'s Cold Fusion for developing Web applications.

Network: Proxim RangeLAN 2 radio frequency transceivers mounted in ceiling tiles; linked by 10M bit/sec Ethernet to Cabletron hubs. Hubs connect over Fast Ethernet to FDDI ring.

Internet access: Two T 1 lines.

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"I didn't think it would work as well as it did," says Frank Novak, director of network services. Downtime has been nonexistent, and the network has been able to accommodate an explosion in usage by students, faculty and administrators.

In fact, Novak says he had to take out about half of the transceivers because he found they were spaced too close together and were creating crosstalk. When he reduced the number of transceivers, performance actually improved.

As with any rollout of new technology, unexpected problems did crop up. For example, students tended to wait for the professor to start the class, then they all booted up at once, which blew out a couple transceivers, Kaufman says. Administrators resolved the issue by asking students to boot up as soon as they arrived in the classroom.

Overall, the wireless LAN has lived up to all expectations, according to Harbaugh. He adds that the college administration accepted the wireless plan on the condition that computers would become an integral part of the college experience — and have they ever.

J. Thomas Rogers, the school's legal technology manager, developed several applications that have proven popular with students, professors and administrators. These include:

- Online registration. Each student goes to the law school's Web site, enters an ID and PIN number, and receives 60 imaginary points to bid on the courses he or she wants to take. Openings in each course go to the highest bidders.
- Finals on floppies. Students have the option of taking their exams online. A proctor gives test takers a special floppy disk that locks down the rest of the computer when the exam program boots up.
- Lecture review. Rogers and his team convert recorded lectures to RealAudio format and post them on the law school's Web site. Students access the recordings using special passwords.
- Virtual study groups. Each class has its own Internet newsgroup, which allows students to collaborate and post documents whether they are at school or at home. For example, students are often required to take opposite sites of a particular case, and this allows both sides to post their arguments.
- Access to grades. Students may enter their exam number and get their grades online, along with the grade distribution for the rest of the class. They can also view course syllabi and previous exams.
- Online résumé bank. Employers post jobs, students post résumés (complete with photos, writing samples and video clips from mock trial presentations) and the software finds matches.
- Recruitment outreach. The admissions office uses Microsoft's Net Meeting to conduct online chat sessions that let prospective students and their parents ask college administrators questions about admissions, financial aid and housing.

There are more ambitious plans on the drawing board. Rogers is testing digital subscriber line for remote access, and he is working to videotape lectures and make them available online.

Harbaugh is also interested in using videoconferencing to expand Nova Southeastern's faculty by allowing visiting professors to teach classes remotely.

For first-year student Alexis, the key benefits of Nova Southeastern's emphasis on technology are the convenience of being able to register for classes online and to communicate with professors via e-mail. She says she also likes the application training she's receiving, which she expects will serve her well after she graduates. ◪

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POWER CLUSTER

BY ANDY EDDY

In the movie *Twister*, there's a thrilling scene in which a tornado barrels through a field and smashes a barn into toothpicks as it heads toward a speeding truck carrying the storm chasers.

Movie makers created this particular bit of magic with special effects and animation. Churning out such high-resolution scenes requires lots of computing power, so computer graphics specialists are turning to distributed computing, or render farms.

Rather than use one computer to generate an image, a render farm spreads the job across several networked computers to speed production. Special software has the intelligence to delegate pieces of the work to available computers, freeing staff members from having to worry about what resources are available.

Cultivating an *Antz* farm

A render farm was handy for Pacific Data Images (PDI), a visual effects and animation studio that created and co-produced the movie *Antz* with Dreamworks SKG.

PDI built a large-scale render farm in early 1997 to handle the massive quantity of rendering required for a feature film, according to Mark Kirk, lead technical director for systems at the Palo Alto company.

> ***The render farm has reduced the time it takes to output a graphic frame by up to 80%.***
>
> Brian Waite, vice president of 3-D graphic engineering, Monolith

The render farm contains about 250 Silicon Graphics, Inc. (SGI) Origin 200 workstations, each with dual R10000 Reduced Instruction Set Computing processors, 500M bytes of RAM and 4G bytes of local disk storage. The systems are connected to several large network file system servers over 100M bit/sec Ethernet, although this summer Kirk will be upgrading most connections to Gigabit Ethernet.

PDI developed most of its own computer graphics applications, but the studio relies on Platform Computing's Load Sharing Facility (LSF) to run the show. LSF is a batch-queuing program that divvies up and oversees the rendering jobs. Kirk says LSF provides flexibility and a high level of automation that helps the firm maximize its computing resources.

> ***A render farm pools multiple computers to tackle the job of creating digital effects and animation.***

"LSF can detect if a machine is idle, and we can set certain thresholds and policies about when and under what circumstances we'll submit jobs to that machine," he says. For example, if someone goes to lunch or heads home at the end of the day, LSF can dynamically add the idle computer's processing power to the render farm.

Generating game graphics

Another company putting a render farm to work is Monolith Productions. The Kirkland, Wash., electronic game publisher uses its farm to generate cut scenes — cinematic animations that connect the playable segments of a game. Monolith also harnesses its render farm's power to more quickly process the complex level maps that create the playfields of its 3-D games.

Monolith uses three Intergraph RenderRAX hardware units, which house a total of 15 rack-mountable computers. Each computer has four Pentium 200 processors and 256M bytes of RAM. The computers are networked via Ethernet and 100M bit/sec ATM. Graphics packages, such as Softimage's Mental Ray and Discreet's 3D StudioMax, distribute the rendering work among the connected systems.

Brian Waite, vice president of 3-D graphic engineering at Monolith, says the render farm has reduced the time it takes to output a graphic frame by up to 80%. That figure varies because Monolith can incorporate idle desktop PCs into the render farm. Waite chose to run the farm on Windows NT so it would be able to interoperate with the firm's Windows 95, 98 and NT desktops.

A starring movie role

Like Monolith, Digital Anvil relies on extra computing muscle to generate cut scenes for its games. Moreover, the production and entertainment firm used the render farm to produce the visual effects for the recent release of Wing Commander, a live action movie based on the game of the same name.

Digital Anvil has adopted a blend of systems to make up its render farm, according to Chris Olivia, visual effects director for the company in Austin, Texas. The render farm includes 450-MHz Windows NT Pentium PCs and high-end Unix workstations, and runs on a switched 100M bit/sec network.

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Proprietary software distributes the rendering jobs to idle computers, while Digital Anvil creates the graphics using Alias | Wavefront's Maya software suite.

Digital Anvil has had a few problems running multiple platforms in the render farm. The current Maya software doesn't yet provide cross-platform compatibility, so the firm needs to run different versions of the product on its NT and SGI boxes.

"It's kind of a hassle to change back and forth," Olivia says. He's waiting for Maya 2.0 to solve this problem, but for now, his NT boxes lay idle because they only support an older version of the rendering software.

Byte-sized graphic creation

In the past, computer graphics specialists typically used one computer to render a frame. However, a render farm boosts processing power by distributing pieces of the job to available computers.

A slower desktop system can be given a small chunk of the overall frame . . .

. . . while a fast, multiprocessor system is devoted to a larger segment.

Special software coordinates and manages the job's completion. The software assesses each system's computing power and availability to determine what share of the job each computer should shoulder.

Just the same, Digital Anvil is looking forward to growing its farm with the addition of more NT systems in the near future. The NT boxes provide a cost-effective way to put more processors on the job.

As the price of computers continues to dive and processing speed multiplies by leaps and bounds, render farms will give entertainment companies even more power to construct visions that push the bounds of the viewer's imagination.

Eddy is an editor for GameWEEK in San Mateo, Calif. He can be reached at vidgames@netcom.com.

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BY TOM HENDERSON

NOS SHOWDOWN: NT VS. LINUX

While Microsoft has the edge over Linux as a server operating system for the enterprise, don't count the little guy out.

Linux has made a name for itself as a formidable Internet application platform. But does Linux have what it takes to play against the big boys as an enterprise server operating system?

In a head-to-head comparison of Microsoft's Windows NT Server 4.0 and Caldera's OpenLinux 2.2, which is based on the most recent release of the Linux kernel, we sized up what each had to offer in the areas of performance, manageability, connectivity, scalability and security.

We concluded that for small and mid-size networks, it's a close race because performance and administration features for the most part are equivalent. Both operating systems offer good extensibility and high availability, but need improvements regarding their ease of installation. Both can run a host of native applications. NT's applications tend to be better integrated, but Linux's are free.

However, NT's ability to host Microsoft's electronic commerce wares and transaction integrity products, such as Transaction Server and Message Queue Server, (which to date have no counterparts in the Linux world), make NT the clear choice for enterprise use.

What about Novell's NetWare? We're big NetWare fans, but because NT and Linux are better positioned as application servers, we looked at them head-to-head.

The basics: File and print performance

We tested each platform as a file server and as a File Transfer Protocol (FTP) server by running test scripts on a dozen clients that imposed heavy loads on the servers (see "How we did it," page 54). We ran the tests twice for each operating system — once using a Mylex RAID storage array and once without it.

The matchup between NT and Linux for serving up files resulted in a split decision. OpenLinux had faster disk support overall, but faltered when we tested it with a Mylex ExtremeRaid SCSI controller. The NT drivers for the controller seemed to have an edge over those for Linux.

The Ethernet connection, through a Compaq Netelligent Ethernet 10/100M bit/sec switch set to run at 100M bit/sec with no other traffic, was consistently saturated during the batch/script test. The connection was less saturated during the FTP put test. Ethernet collisions and retries seemed to have an insignificant bearing on test results.

To test how each platform handled the second basic network operating system (NOS) function — printing — we used a Lexmark Optra 1865 color laser printer, set up as a TCP/IP print server over Fast Ethernet, and a Hewlett-Packard LaserJet 5M as a locally connected parallel printer.

NT Server offers print services for locally attached printers, and spooling or queuing a job is easily controlled from any Windows desktop. NT Server supports printer shares for locally attached printers and network printers that have their own built-in print server controllers.

Linux allows users to share networked printers in one of two ways. Printers can be hooked up to the Linux net as either a Server Message Block (SMB) shared device, represented to users as a Windows Printer Share, or (using a Lexmark printer driver) as a Unix-style lpr device. In either case, the Linux server spools print jobs through an lpr command.

A significant downside to this configuration is that an end user can't easily control an lpr device from a Windows client machine. Administrators must give users who need to manipulate spooled print jobs extra security privileges.

Net Results

Windows NT Server 4.0	**OpenLinux 2.2**
Microsoft	Caldera Systems
(425) 882-8080; www.microsoft.com/ntserver	(801) 765-4999; www.calderasystems.com/products/openlinux/index.html
$1,129 for 10 client licenses	$50 per CPU for unlimited users
Pros	**Pros**
▲ Strong user interface	▲ Improved hardware detection over previous versions
▲ Sophisticated Web services	▲ Lean and mean resource use
▲ Broad Intel-based hardware support	▲ Myriad of administration tools
▲ Great administration interface with MMC	▲ Excellent value
Con	**Cons**
▼ Older domain management model maps poorly to enterprise infrastructures	▼ Weaker hardware and device support than NT
	▼ No desktop policy enforcement components

ScoreCard

	Performance 25%	Administration 25%	Scalability 20%	Security 10%	Accessibility/ Features 10%	Installation and setup 5%	Documentation and online help 5%	Total score
Windows NT Server 4.0	7 x .25 = 1.75	8 x .25 = 2.00	8 x .20 = 1.60	8 x .10 = 0.80	9 x .10 = 0.90	8 x .05 = 0.40	7 x .05 = 0.35	7.80
Caldera OpenLinux 2.2	8 x .25 = 2.00	7 x .25 = 1.75	6 x .20 = 1.20	7 x .10 = 0.70	9 x .10 = 0.90	8 x .05 = 0.40	8 x .05 = 0.40	7.35

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

Administration is key

In addition to good file and print performance, network administrators need a NOS that makes it easy to manage users and groups quickly and efficiently.

Microsoft provides three different administration models with NT. There are older Windows-based applications such as User Manager for adding or deleting users. There are newer task-based wizards that walk an administrator through common management tasks such as changing which users belong to a specific network grouping. And then there is the Microsoft Management Console (MMC), a highly extensible user interface for a wider variety of systems and network management tasks.

Using Microsoft's Distributed Component Object Model, you can customize MMC for flexible network management and administration. For example, you can create a customized view of all your network servers based on how you have defined group file permissions. The OpenLinux administration tools lack this flexibility.

While MMC provides more management flexibility, it doesn't pay off handsomely until the number of servers increases. This fact once again tilts the advantage toward NT in networks with a large number of servers or where rapid expansion is planned.

The administrative tools that arrive in the box with Linux generally contain five essential groups of tools: user management, system file management, system backup support, basic system availability support and communications/networking support.

The control of user-side resources tips in the favor of Microsoft in Windows desktop environments. Even though NT policies for Windows desktop users of NT servers are granular and difficult to deploy (often requiring extensive function control knowledge on the part of an administrator), they still beat Linux. In terms of the ability to control clients through server-based desktop policy enforcement, Linux has paid virtually no attention to this total-cost-of-ownership concern. (Caldera OpenLinux 2.2.5 is a general release; Caldera plans a server-specific release of OpenLinux sometime this summer.)

OpenLinux provides all network administration information via a graphical application with predefined nonextensible functionality. Caldera also offers OpenLinux Administration System, an additional graphical utility for executing common administrative tasks such as creating new users or defining quotas or file permissions. The administration applications are easy to understand and join like groupings of tasks. While not as flashy as MMC, the OpenLinux administration applications are as functional as MMC's administration wizards.

Linux administrators can also use standard Unix command lines to perform basic administrative tasks such as adding and maintaining users and changing file permissions.

Literally hundreds of Linux applications and utilities come in the box and on CD-ROM from Caldera. Some of the applications run under an X/KDE user interface, but many do not and most aren't integrated with each other. Most of the supplied applications are ports of programs from Unix, but some are specific to Linux (or Linux distributions), including improvements for multimedia such as CD-ROM players.

Scaling the enterprise

Like administration tools, scalability is a key concern for environments with dozens of servers.

NT Server aggregates servers into groups called domains. Domains are generally used to divide geographic branches into localized resource managed areas. Inside every domain there is a single server, called a primary domain controller (PDC), that acts as the authentication nexus. There are also several optional backup domain controllers that give users access to the appropriate network services should the primary controller go down. Domains can be linked in a complex lattice of trusted relationships.

In the Linux world, there are no direct counterparts to NT's domains for central control over user authentication. It is possible to connect Linux servers using Lightweight Directory Access Protocol servers to construct off-server authentication authorities. Or you can configure Samba, an open-source application that provides file and print services to Server Message Block clients, on top of a Linux box so users can authenticate against an NT PDC on the same network.

But in spite of these add-on authentication options for Linux, NT still gets the nod for scaling to fit the enterprise space.

More Online

- A detailed discussion of our experience installing the operating systems.
- Our review of IIS and Apache Web servers.
- Information on NT, Linux, Samba and Apache.

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DocFinder 2921

The matter of security

Security is another major concern. Operating system security issues include controlling file access, providing proxy or firewall protection, and encrypting data before it hits the network wire.

If you use the NT File System (NTFS), the operating system automatically secures and encrypts important system files and all network passwords. Linux doesn't do this by default, but it's easy to do as an added step during configuration.

File permissions for NT are easy to set through group and individual permissions. However, one potential problem with NT is that a secure ID (SID) is set for users at the time they're created. Deleting a user removes the SID. If you create another user with the same name, NT generates a new SID. Because the two SIDs don't compare, applications that use SIDs to identify end users — such as Microsoft Exchange Server — won't recognize the first SID username as the second SID username. Administrators must therefore manage user names and SIDs carefully.

Table 1: File system stress test results

Figures in seconds, CPU utilization percent

		HP LPr	HP LPr/Mylex
Batch read/write test			
Caldera OL2.2		213, 9	187, 9
NT 4		221, 11	161, 7
FTP 100M-byte Put			
Two senders:	Caldera OL2.2	18, 6	15, 6
	NT 4	20, 4	13, 3
Four senders:	Caldera OL2.2	22, 6	18, 6
	NT 4	22, 4	16, 3

Note: Smaller numbers indicate faster throughput and less CPU load, and are therefore better. We did not report test results for the Compaq Proliant 1600 because our results did not fall within an acceptable 10% standard deviation window.

This problem doesn't exist in Linux, which is a plus on the administration side. But the downside is that spoofing user names in a Linux environment is possible under certain circumstances.

Proxy services are available for both platforms. But thanks to the graphical front end of NT's Routing and Remote Access Services, we found it was easier to set up proxy servers and port blockages on NT. OpenLinux's process for setting up proxy services and port blockages requires many more steps involving several character-based applications.

We used Internet Security Systems' (ISS) SecureScanner 5.6 to test the servers for security holes. We ran the test with default installation and again with security fixes suggested by each vendor. NT passed the ISS SecurityScanner test with flying colors, but OpenLinux hit some snags.

Caldera starts many services when booted, and these services were seen by ISS SecurityScanner as potential system weaknesses. We were able to pass the SecurityScanner test by making several modifications to configuration files to halt the unused daemons that could have opened the system to denial-of-service attacks or posed a breach of data security.

It's arguable that the NTFS is more inherently secure than Linux Filing System, but Linux offers cross-platform file system support that NT lacks. OpenLinux can be booted to run on IBM's OS/2 High Performance File System. It can also recognize and mount Macintosh diskettes and CD-ROM filing systems.

NT has another security advantage in that the Option Pack includes a certificate server, also known as a certificate authority (CA). CAs can be used by e-mail applications for authentication using public-key infrastructure. In the future, many vendors are planning to use CAs for user logon authentication, as well as encryption and decryption.

OpenLinux lacks a certificate server.

Internet and LAN access

Both server operating systems support Web, Network News Transfer Protocol and FTP services for giving end users access to the Internet.

While the Internet Information Server that comes bundled with NT Server supports Microsoft Active Server Pages and additional scripting methods such as Perl, it's much more of a resource hog than its Linux counterpart.

Linux supports numerous TCP/IP applications, including terminal services (an option for NT as a separate version of the operating system), and common Unix commands, such as finger and whois.

OpenLinux and NT Server support access via HTTP, FTP and Network File System links. For LAN access by Windows clients, both server operating systems support TCP/IP and IPX/SPX.

Linux requires some additional steps to make resources available to Windows clients because Windows clients natively look for SMB resources on a network. The TCP/IP protocol can "publish" resources through the Windows Internet Naming Service service. Servers can also use NetBEUI, a non-routable protocol, to publish their resources through the use of advertising protocols.

Windows clients can get to files sitting on a Linux box in a way that they readily understand via Samba. However, making Samba work correctly requires a familiarity with the Linux server's configuration and resource sharing. Therefore, setting up user access this way is somewhat more difficult than configuring file shares under NT. With Samba, file locking is primitive, and file permissions are a subset of (and depend on) permissions set by Linux administrative applications.

The alternative to Samba is Sun's Unix-based Network Filing System (NFS). NFS is installed by default

How we did it

We used two base hardware platforms: a Hewlett-Packard LPr (450-MHz Pentium II, 192M bytes dynamic random-access memory [DRAM]; Symbios Logic drive controller with two 8G-byte Seagate drives; Intel 10/100 Ethernet network interface card [NIC]) and a Compaq ProLiant 1600 (twin 450-MHz Pentium IIs, Compaq Smart Array/DH, four 8.3G-byte Seagate drives, Compaq Netelligent 10/100 Ethernet NICs). Also used on both platforms was a Mylex 1100 64M-byte UltraWide SCSI-3 Array Controller connected to an Andataco 8-SCSI drive array with 8.3G-byte Seagate drives. We installed the Mylex 1100 Array controller with suggested factory defaults and allocated 50% of cache to reads and 50% to writes.

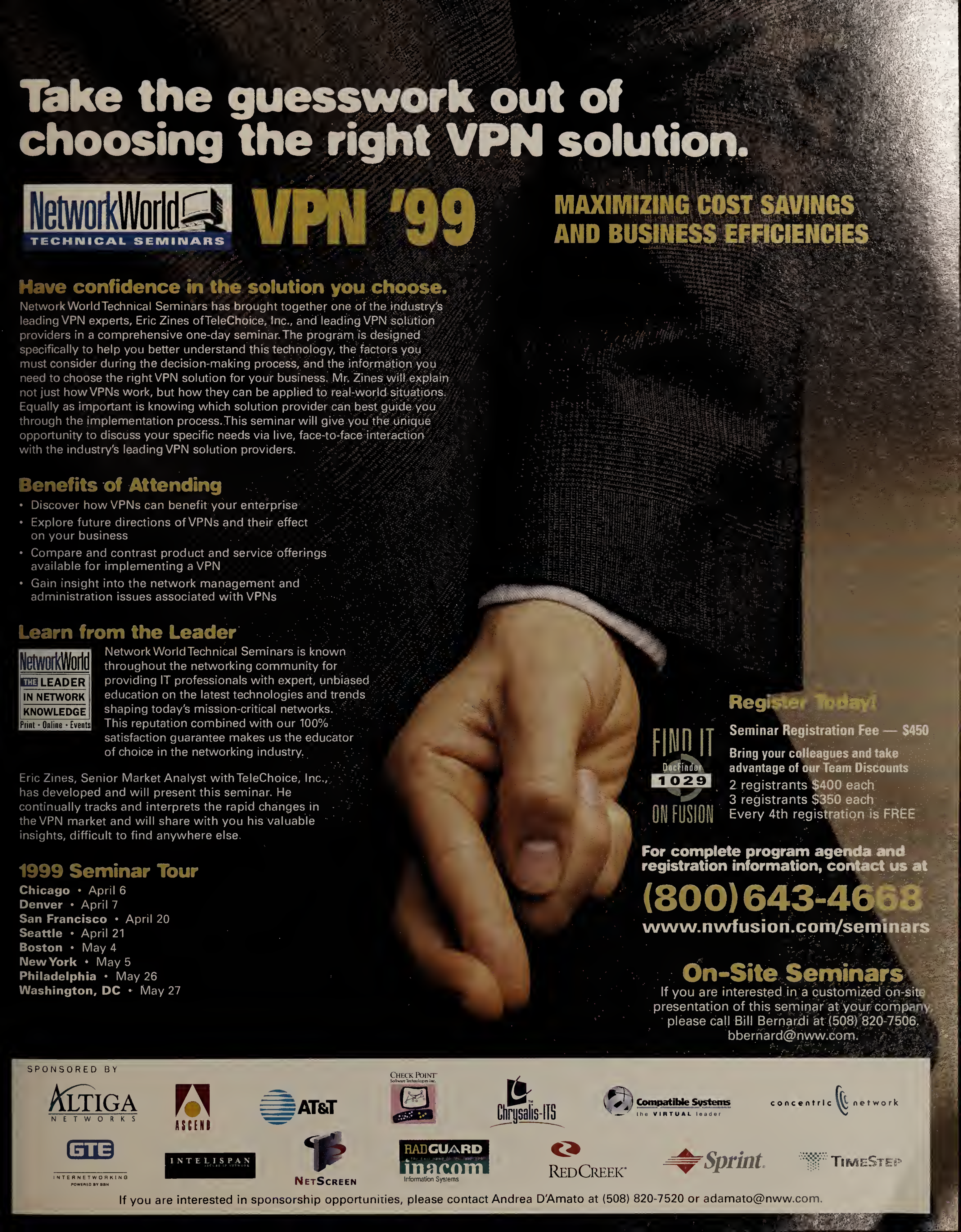
Clients included 12 PCs and notebooks running Windows 95/98, Windows NT 4.0 Workstation, RedHat and Caldera Linux, and FreeBSD Unix.

Each server was tested out-of-the-box using only supplied components with Windows NT 4.0 (described elsewhere) and Caldera OpenLinux 2.2, which uses the Linux 2.2 kernel. Each platform was retested using the Mylex 1100 RAID controller.

We used Internet Security Systems' SecureScanner 5.6 to test the servers for security holes on the default platform, then the default platform with vendor-suggested security fixes.

We used WilsonWindowWare's WinBatch to launch a batch file on Windows platforms, a bash script to trigger Linux and the FreeBSD clients into a series of file reads and writes to the server, and then timed their execution. Averages were taken after 10 test iterations; data fell within 5% of the averages shown. The clients were free of any other nondefault processes running at the time. The following processes were running on NT and Linux server platforms: Domain Name System (with upstream authority); DHCP (no leases); Web service (Internet Information Server and Apache, respectively); the user interface (Windows graphical user interface and XFree86) and File Transfer Protocol (FTP) service. Server Message Block access to Linux was provided by Samba for all clients connected.

We also performed a simple FTP put test, which wrote a 100M-byte file for two and four identical senders (HP 4440 Pavilions with 333-MHz Celeron CPU and 64M bytes DRAM) on to the tested server. We tracked CPU utilization using the X CPU application on OpenLinux and PerfMon on NT Server.



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by Caldera. Manual configuration of NFS can be daunting for Unix neophytes, and users on Windows workstations must purchase third-party NFS client software to make Linux accessible via NFS.

Installation, documentation and support

NT had no problem autobooting to the HP or Compaq platform. The NOS recognized all components inside both machines.

However, the Compaq Smart Array/DH combination threw the NT installation program for a loop during the initial partitioning stage. It was unable to format the 26G-byte space on the array. After several attempts, we realized that an 8G-byte space was the maximum size supported. Installing the rest of the software took several reboots and four CD-ROM swaps.

By comparison, OpenLinux started after a single reboot. Installation of OpenLinux was surprisingly simple even though the product includes no support for the Compaq Smart Array controller. We were, however, able to get the Mylex/Andataco/Compaq combination working after configuring the controller under Windows, via software supplied by Mylex.

Microsoft's bundled NT documentation is a bit skimpy, and online help screens can be disjointed and aren't a substitute for training.

Caldera had a better mixture of supplied documentation. On top of the bundled manuals, a tremendous amount of online Web-based documentation for Linux features is available. Various product features, such as Samba, have Web sites of their own.

Microsoft offers support to customers for the first 30 days. Calls made to Microsoft proved to be competently and completely answered. Microsoft publishes a TechNet CD-ROM of patches and fixes, as well as a database of support information. By contrast, Linux support can be obtained by any of the commercial Linux vendors, such as Caldera, for an extra fee.

Hats off

We also looked at RedHat's Linux 5.2 during this review, but didn't report our results because RedHat's product was based on an older version of the Linux kernel. The version based on the Linux 2.2 kernel wasn't ready in time for this review, but was announced at the end of last month.

Linux support on the Internet is legendary, and we were able to get questions answered through Linux news groups rapidly. Linux supporters also seem to go to extra lengths to try to tolerate newbies. Microsoft also offers a host of newsgroups, but we find that sophisticated questions about NT problems often go unanswered. However, Microsoft's Web server-based Knowledge Base is a good source for fixes to common problems.

We found the lack of vendor hardware support for Linux to be an impediment. While major vendors such as Compaq, IBM, Dell and others have pledged support, we found that the announcements haven't yet caught up with reality. We recommend checking for platform certification prior to deployment. NT runs on all Intel platforms and it is difficult to beat the staggering number of hardware items supported by NT. But you'll never find NT on a Sun SPARC machine, whereas you'll find version of Linux readily available just a few clicks away.

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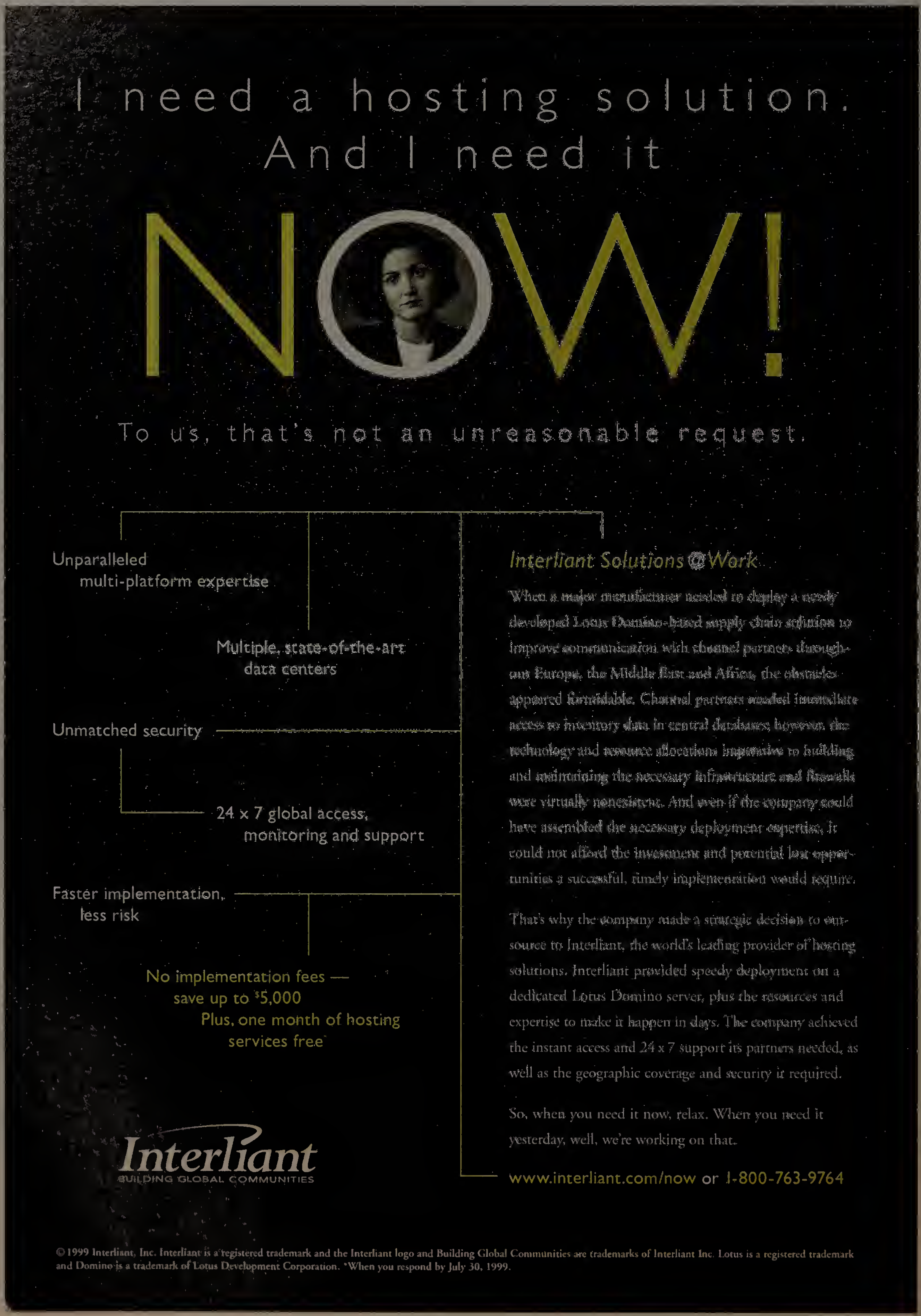

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Psychological profiles

Personality tests can help you build a compatible workgroup and learn more about yourself.

BY ARTHUR BELL

No hiring manager can afford to put a square peg in a round hole. Employees who don't fit the corporate culture drag down profits, productivity and morale. These workers change employers often, leaving unfinished projects and sour relationships in their wake.

If you were dealing with hardware or software, such compatibility problems would have been obvious from the beginning. But the people who run your network don't come with reliable spec sheets.

However, personality testing offers a way to head off potential problems. Test results help you gauge what kind of person is well-suited to specific responsibilities and choose team members who have complementary strengths.

Forever Jung

The problem of incompatible human personalities interested Swiss psychologist Carl Jung to the point of obsession. His elaborate notes on hundreds of patients were the basis for his Theory of Personality Types that he introduced in 1921.

The idea is simple, even if its application is often complex. Jung proposed that we all have personality tendencies that play out through our lives. Discovering these tendencies helps us choose occupations that take advantage of our strengths and lets us deal more effectively with different types of people.

These tendencies to feel and behave according to our own largely fixed habits of mind can be viewed as a series of four scales with opposite poles. All our personalities have aspects of each scale, and none of us are "pure types." We act under the internal influence of personality factors in varying degrees of dominance. The four personality trait scales are:

- Extroversion (motivated by and responsive to others) vs. Introversion (reliant upon internal, independent influences)
- Sensing (concrete, specific, applied) vs. Intuition (conceptual, abstract, theoretical)
- Thinking (rational, cerebral) vs. Feeling (led by emotions)
- Perceiving (flexible, accepting of change, spontaneous) vs. Judging (planned, orderly, systematic)

For example, the INTJ personality type is characterized by dominance in Introversion, Intuition, Thinking and Judging. An INTJ is probably the wrong guy to put in charge of organizing corporate social events, but he may be well-suited to work with detail-oriented end users. In network rollouts, he plays the role of Mr. Spock — rational, organized, unemotional — rather than the gung-ho, inspiring team leader Captain Kirk.

SIS/BRUNO BRESSOLIN

IT departments, of course, require virtually every personality type to fill varied job responsibilities. "Certain people and skills are better utilized in network design and implementation, yet others contribute more significantly in a management or steering capacity," says Michael Colaneri, business and sales manager for AT&T Data Networking.

Just after World War II, the mother-daughter team of Katherine Briggs and Isabel Briggs Myers developed an easy-to-administer test for determining personality predispositions. Widely known as the Myers-Briggs Type Inventory (MBTI) and marketed by Palo Alto-based Consulting Psychologists Press, the test poses about 100 questions. Here are some examples:

- Would you rather work for someone who is always kind or always fair?
- In a group, do you often introduce others or wait to be introduced?
- Do you find it harder to adapt to routine or to more-or-less constant change?

The answers to these sorts of questions build a profile of a test-taker's personality tendencies. In 1998, more than three million people took the MBTI, at an average cost of $10 per test. Companies that have widely used the test include 3M, AT&T, Apple, Citicorp, Exxon, General Electric, Honeywell and Lucent.

It turns out that about 60% of businessmen are strong on the Thinking dimension, while 60% of businesswomen are strong on Feeling. Interestingly, INTJ (Introversion, Intuition, Thinking and Judging) is the most common trait set found among CEOs.

When it comes to network professionals, Sensing and Perceiving are common desirable traits. Such people tend to be applied and detail-oriented, yet quick to respond to change and good at putting out fires.

How to use the results

Just as you shouldn't hire someone based solely on their credentials or interview performance, it isn't wise to base your decision on the results of a personality test alone. However, personality tests are useful for these purposes:

- Self-discovery, including understanding what you like and dislike about your job and how you can be more effective.
- Conflict prevention and resolution. Once you're aware of your personality needs and tendencies, you're armed to deal strategically with those whose personality types run counter to yours.
- Team-building. Knowing your colleagues' personality types gives you a leg up on building teams. The best of both words is to choose individuals whose personalities complement, but don't clone, each other's strengths.

Bell is a professor of management communication at the University of San Francisco's McLaren School of Business. He is also a consultant and the author of more than 30 books on management. He can be reached at bell@usfca.edu.

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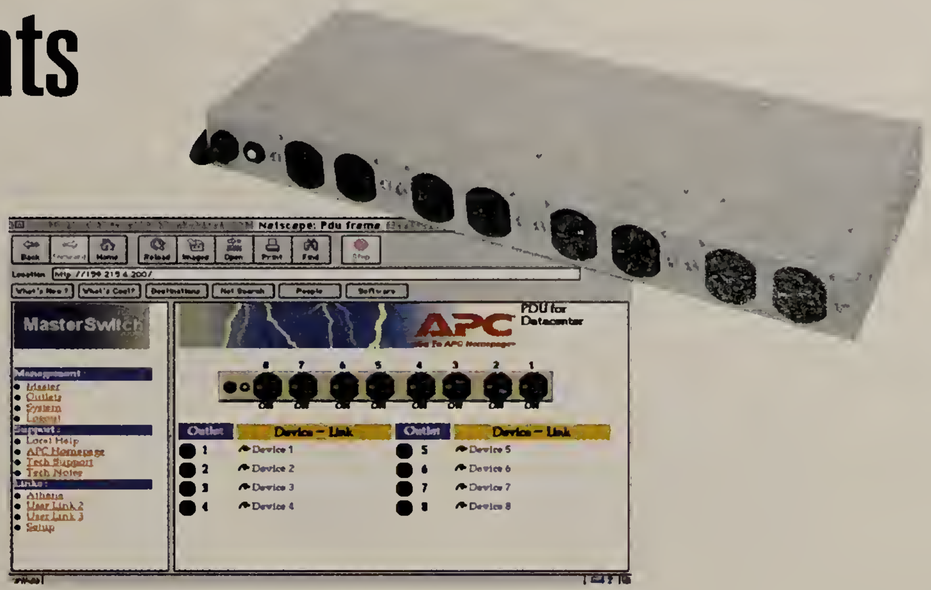

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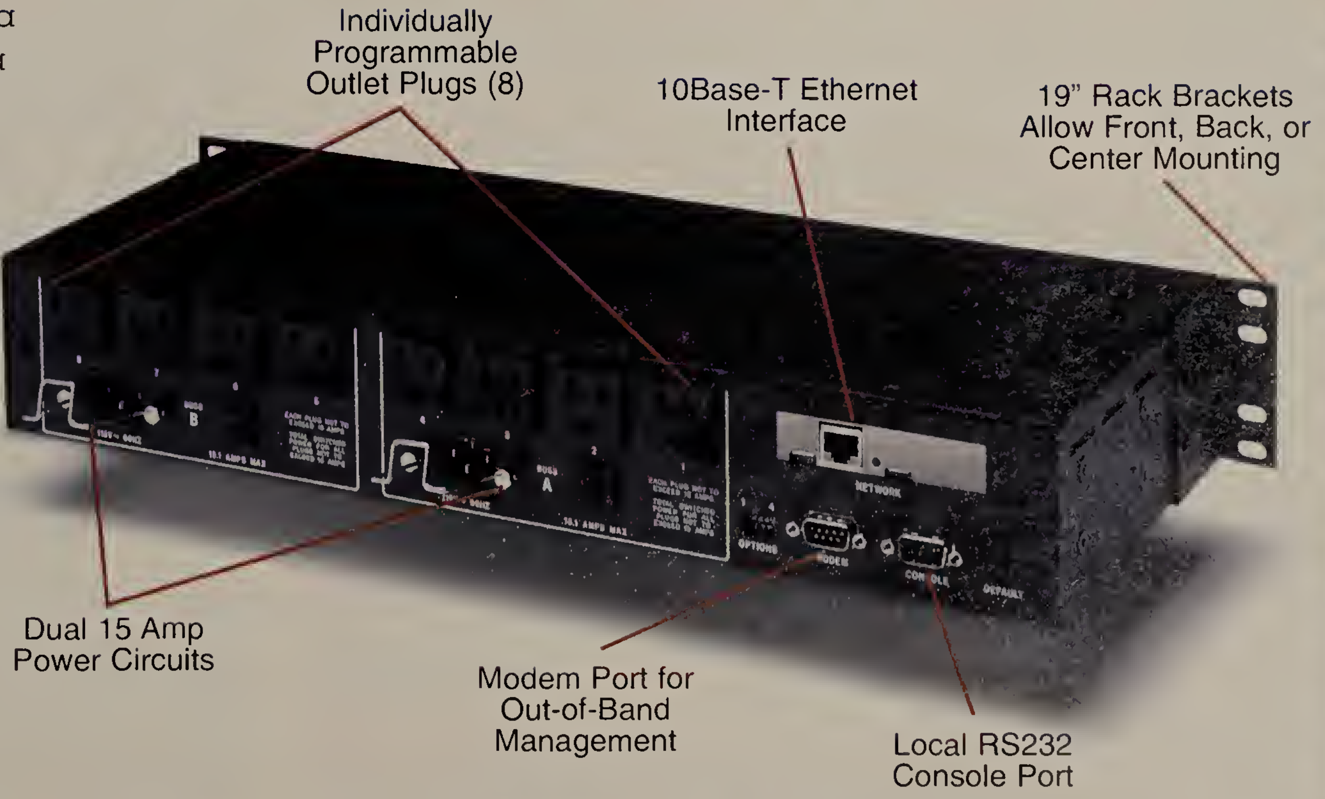
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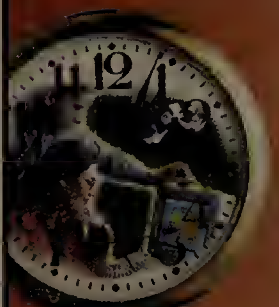

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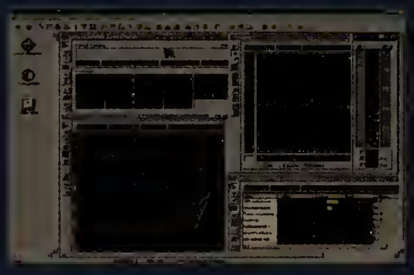

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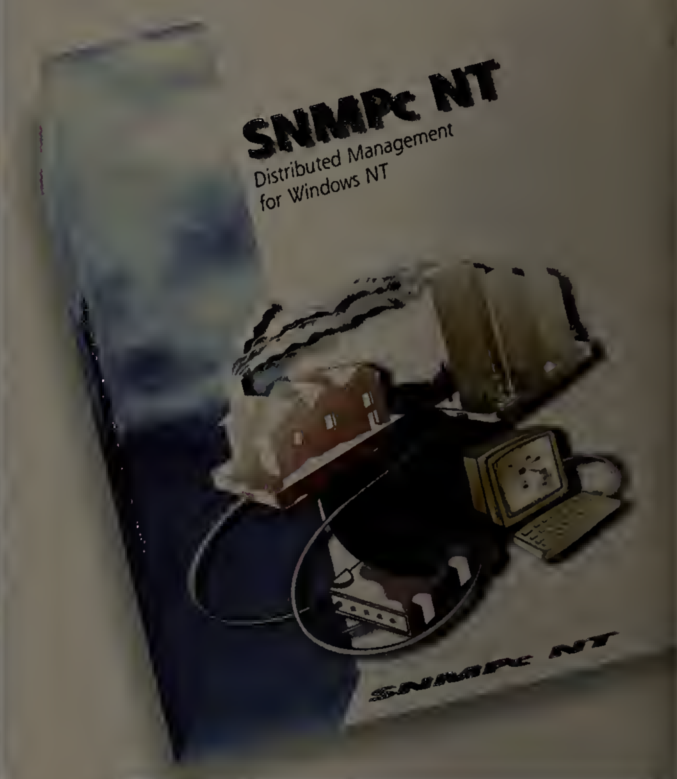

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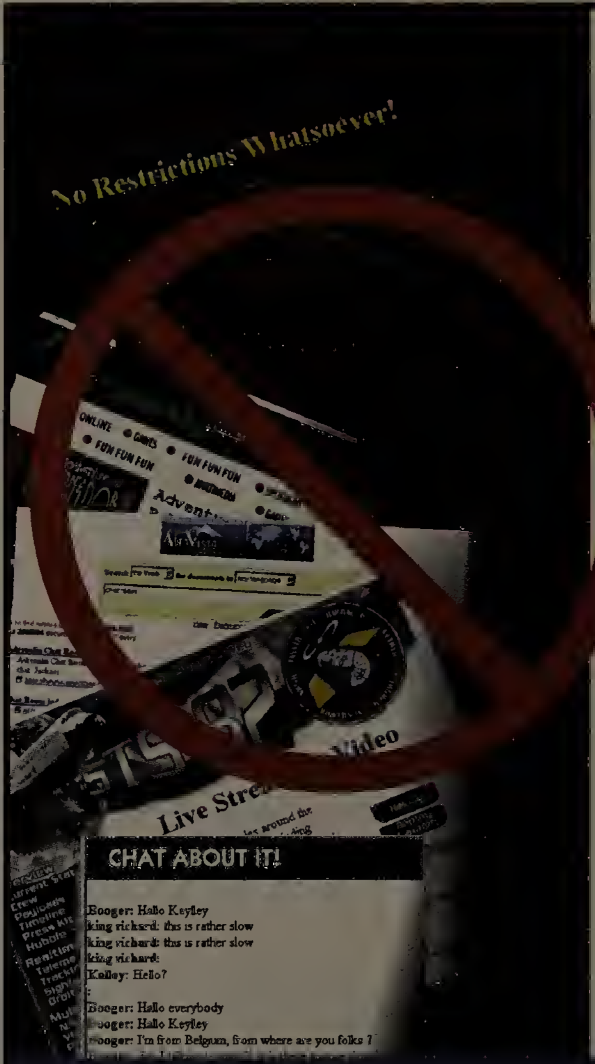

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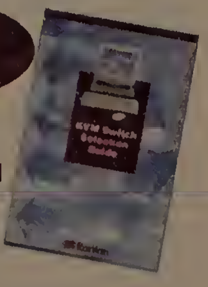

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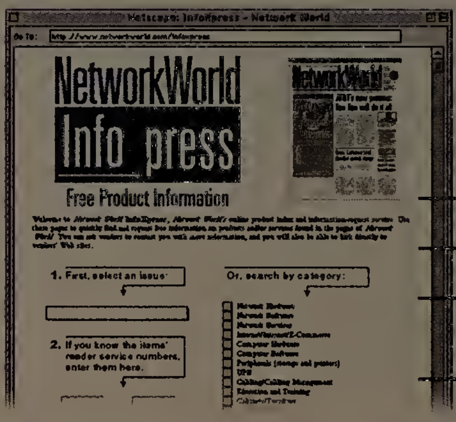

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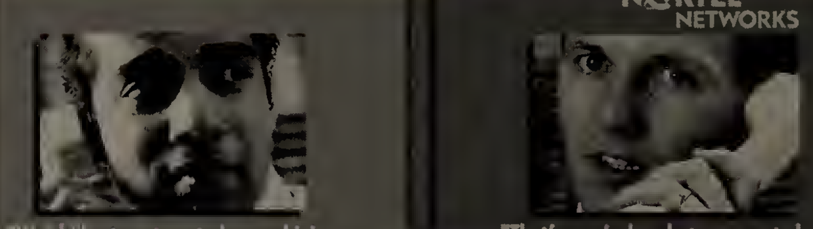

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EDITORIAL INDEX

A
ACS Innovations .38
Altiga .22
AT&T .1
B
BoostWeb .29
Brightware .29
C
Cabletron .16
Caldera Systems .53
Cisco .16
Compaq .6,14,19
D
Data General .6
E
Elron .25
Equant Network Services .10
Extreme Networks .14
F
Focal Communications .25
FujiFilm .10
I
IBM .6,8,29
Intel .8
IPHighway .25
L
Lotus .6
Lucent .25
M
Manage.Com .33
MCI WorldCom .1,6
Microsoft .6,8,53,69
Mitsubisni .38
Motorola .1
N
NetFormX .29
NetReality .25
Network Engines .19
Novell .1,8,12
NTP Software .20
P
Packeteer .25
Q
Qwest .14
R
Radware .20
Red Hat Software .1,8
S
Shunra Software .29
Siebel Systems .6
Software.com .70
Sprint .1,10,14
Sun .1,8
Sync Research .19
T
The Santa Cruz Operation .1,8
TimeStep .10
Tivoli .1
TriStrata Security .6
U
US WEST .14,25
UUNET .10
X
XLNT .8
Xylan .14

ADVERTISER INDEX

Advertiser	Reader Service#	Page#	URL
3Com Corp		44	www.3com.com
Adtran	70	72	www.adtran.com
Alcatel		11	www.usa.alcatel.com
AMCO Engineering	256	60	www.amcoengineering.com
American Power Conversion	338	59	www.apcc.com
American Power Conversion	71	32-33	www.apcc.com
American Technology	302	62	www.atli.com
Black Box Corp	331	61	www.blackbox.com
Cable & Wireless	76	39	www.cwusa.com
Castle Rock Computing	252	62	www.castlerock.com
Compatible Systems Corp	77	12	www.compatible.com
Computer Associates	78	30-31	www.cai.com
Dataprobe Inc	285	60	www.dataprobe.com
Digital Link Corp	79	48	www.dl.com
Diversified Computer Sciences	379	62	www.dcsi.com
Elron Software	72	52	www.elronsw.com
Exabyte Corp	87	36-37	www.exabyte.com
Excel Computer	217	64	www.excelcdrom.com
Global Technology	292	62	www.gnatbox.com
IBM		17, 42-43, 71	www.ibm.com
Intel Corp		9, 21	www.intel.com
Interliant	88	56	www.interliant.com
International Network Services (INS)	80	7	www.ins.com
Internet Dynamics Inc	326	63	www.conclave.com
Kansmen Corp	298	64	www.kansmen.com
Microhard Technologies	322	60	www.microhard.com
Microsoft Corp		2-3	www.microsoft.com
*NBase Xyplex	81	55	www.nbase-xyplex.com
Network 1	73	22-23	www.network-1.com
Network Instruments	290	60	www.networkinstruments.com
Nortel Networks	74	4	www.nortelnetworks.com
Raritan Computer	314	64	www.raritan.com
Rose Electronics	289	63	www.rosel.com
Sequent Computer Systems	83 84	13, 15	www.sequent.com
Supercomm '99		69	www.supercom99.com
Symantec Corp		50	www.digital-immune-system.com
Telcordia Technologies	75	27	www.telcordia.com
TeleSwitch Corp	321	64	www.teleboot.com
UUNET		18	www.uu.net
Unisys Corp		25	www.unisys.com
Western Telematics Inc	250	59	www.wti.com
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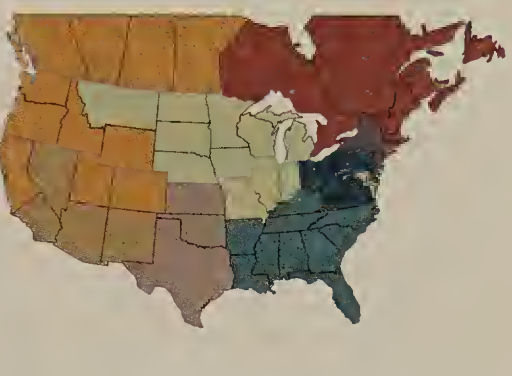

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AT&T,

continued from page 1

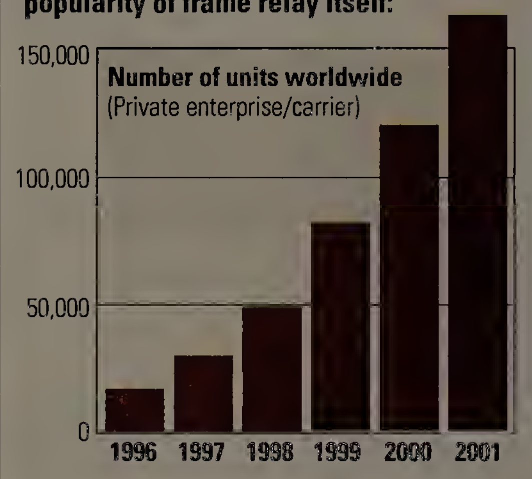
To some extent, the MMNS service, whose name may change before it debuts, is an expansion of AT&T's existing managed FRAD program. Some users have leveraged FRADs on their own to begin sending voice traffic over the AT&T frame relay network, acknowledges Bill Callahan, AT&T's director of managed network solutions. "But this is the first time AT&T has come out and said, yes, we're doing voice over frame relay." As part of the managed service, AT&T will specifically tune and monitor each user's frame network for voice.

AT&T's rivals have toyed with similar concepts. Sprint announced voice over frame relay first in 1997 but never rolled it out. Sprint officials recently said users seeking converged services should now look at the company's Integrated On-Demand Network, a still-evolving ATM-based platform for voice, data and video. MCI WorldCom's Advanced Networks division last year introduced a voice-over-frame option, although it does not run over the carrier's principal frame relay network, as does the AT&T offering.

Initially, most AT&T customer sites are expected to use Motorola Vanguard 6430 and 6450 multiservice devices, designed for mid-size branch or regional offices. But sources say the entire Vanguard line, which specializes in multiprotocol data support as well as multimedia applications, will be available.

Frame relay goes multimedia

The number of voice-enabled frame relay devices installed in carrier and enterprise networks is growing in line with the popularity of frame relay itself:



SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

The MMNS service likely will not come cheap. Although AT&T officials last week said they were not ready to release exact service prices, they acknowledged users will have to pay AT&T's regular fees for each frame relay port, permanent virtual circuit (PVC) and dedicated access line. In addition, the Motorola boxes will carry an equipment charge, and AT&T will tack on an additional per-site management fee, as it currently does for existing offerings such as managed router service.

But users will save money by adding voice to the frame relay net, thus eliminating per-minute toll charges. The Motorola boxes support voice-compression down to 5.3K bit/sec, enabling some users to load phone calls and faxes onto their existing frame relay nets, Callahan says.

Still, users will have to be careful to allow for peak periods, cautions Lisa Pierce, a telecom analyst at Giga Information Group. "If there is a fair mix of both traffic types during busy periods, separate PVCs are required, and then the price will go up," she says.

AT&T appears to be willing to take the risk of losing per-minute tolls — the traditional backbone of its business — because MMNS will add to the growing stable of offerings from AT&T Solutions, the company's managed-service and outsourcing arm. Now incorporating the former IBM Global Network and some LAN-management offerings, AT&T Solutions is one of CEO C. Michael Armstrong's favorite units and is on track to contribute at least $4 billion per year to the company's revenue by 2002. MMNS contracts will also keep customers away from increasingly aggressive toll offers from Qwest and other carriers.

AT&T's biggest marketing challenge will be to distinguish MMNS from INC, the service AT&T announced in January that is scheduled to remain in beta testing through the third quarter. With INC, multiple lines are aggregated by an ATM device onto a single T-1 line, Callahan says. But voice and data are split into separate paths in the AT&T long-distance network, resulting in dual network-management facilities and possible toll charges. ◪

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Spam,

continued from page 1

antispam experts.

"It doesn't make sense for you to throw away mail that you want unless the cost of getting and processing the spam is so high that it is worth the lost business," says Paul Hoffman, director of the Internet Mail Consortium (IMC). "I don't believe that is the case here."

At the heart of the matter is "open relay" spamming, the practice by which spammers exploit an element of Simple Mail Transfer Protocol (SMTP) to send junk e-mail through the servers of unwitting companies and service providers. Such spam can sap server processing capacity and, perhaps more important, leave the false impression that the victimized server owner actually sent the offensive e-mail, thus creating the potential for a public relations disaster.

In general, experts agree on the wisdom of closing those open relays and providing alternate means of e-mail access for off-site employees. The disagreement surrounds the question of how to treat e-mail from ISP and corporate servers that remain open to relaying because their owners cannot or will not close them. About one-third of all SMTP hosts remain open to relaying, according to a 1998 IMC survey.

A relatively small number of antispam hardliners, including Tivoli, are choosing to treat e-mail from these open relays as inherently suspect. They are using a "blacklist" database called ORBS — Open Relay Behavior-modification System (www.orbs.org) — to either bounce or filter out for further inspection any e-mail that arrives from open relays. Another antispam service called MAPS (Mail Abuse Prevention System) Realtime Blackhole List is more widely used but much less controversial. MAPS (http://maps.vix.com/rbl/) targets known spammers and their ISP "accomplices," as opposed to any open relay server and, therefore, blacklists far fewer sites than does ORBS.

Alan Brown, who administers ORBS from his small ISP in New Zealand, says three dozen ISPs and companies worldwide receive periodic updates of the ORBS database. In addition, "10,000 to 20,000 hosts are doing regular Domain Name System lookups against the ORBS list, but there is no way of translating that back to a number of actual mail servers," he says.

The ORBS database relies on public submissions to identify open relays and currently lists about 100,000 SMTP hosts, a number that has more than doubled in the past six weeks, "thanks to a couple huge, overlapping spam-trap submissions," Brown adds. He has no qualms about trading bounced e-mail for better spam control.

"I'm happy to put up with some legitimate mail being tossed out with spam, simply because it's the legitimate mail being lost and the users beating up on their network administrators that cause those servers to get fixed," says Brown, who defines "fixed" as closed. "The more legitimate mail that does get blocked [by such policies], the faster those open relays get fixed."

Bringing such pressure to bear on companies, whether they are spammers or not, strikes some as unfair, if not bad business.

"It's overkill," says one Tivoli employee who reports having had significant problems with legitimate business e-mail getting bounced. "We look like we don't know what we're doing."

Another Tivoli employee, who also requested anonymity, says the company's policy has supporters and detractors among the rank and file.

"It was evenly split," he says of a recent internal e-mail thread on the subject. "There were a lot of people who felt that we should not be telling other companies how to run their businesses [by demanding they close their relays]." He, too, has doubts, but adds, "The fact is, I really like not getting spam."

The most recent IMC survey of relay status last July showed that about one-third of SMTP e-mail servers remained open, down from about one-half in February 1998. While director Hoffman agrees with most experts that companies should close their own relays to ward off opportunistic spammers, he does not believe the practice will be effective in stemming the overall volume of spam.

"Because there are so many open relays, if we closed 99% of them, that would cause [only] an imperceptible drop in the amount of spam . . . and we're never going to get to 99%," Hoffman says. "This is a cheap way of doing spam filtering that is known to be not effective." ◪

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Microsoft starts stitching together BackOffice, Office

BY JOHN FONTANA

LAS VEGAS — Microsoft's efforts to more closely integrate its BackOffice server suite and forthcoming Office 2000 package into a knowledge management platform are finally starting to gel.

At NetWorld+Interop 99 last week, Microsoft unveiled Team Productivity Update for BackOffice 4.5, which begins to tie the server suite's components together into a collaboration environment with a common interface. BackOffice 4.5, which is now shipping, is a suite of Windows NT-based servers that includes messaging, database, management and legacy connectivity.

The update lets administrators give end users the ability to create multi-user collaborative work sites that include documents, calendars, contacts and tools to analyze line-of-business data. For the first time, users will be able to do analytical processing using Excel 2000 (part of Office 2000) and SQL Server.

While the initial efforts are encouraging, work remains on features such as workflow and document management. Those features are expected in BackOffice 5.0 next year as part of a package code-named Polar, sources say.

Users and analysts say security is a pressing issue. Freewheeling document and data sharing among end users could erode administrative access control to corporate resources.

"Centralizing documents so you can do things like backup is good, but administrators have to control access, or availability of data gets out of hand," says Joe Venturelli, network operations manager for Novant Health, a health care system in North Carolina.

Microsoft's goal is to have Office 2000 or Internet Explorer 5.0 as the single interface to BackOffice, according to Kevin Breunig, group product manager for BackOffice.

"We're pulling together the Office 2000 document-sharing world, the collaborative world of Exchange and the line-of-business world of SQL," he says.

The productivity update includes a set-up wizard; a set of collaborative applications based on Office 2000 Server Extensions, Exchange and SQL Server; and a set of APIs.

"The theory behind this tool is solid," says Dwight Davis, an analyst with Summit Strategies. "But it raises security issues for IT administrators who will be allowing end users to make data available to other end users. The question is, will administrators retain the right to enforce security over which users have access to what data?"

Davis says IT executives may want Windows 2000's Active Directory, in which access rights can be centrally controlled, before they feel secure with the productivity update.

Microsoft has also added a number of administrative features to BackOffice 4.5, including a branch office set-up wizard and a multisite deployment tool, which allows set configurations to be replicated. The new management console, based on Microsoft Management Console, consolidates administrative functions into a single snap-in software module. ◪

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Backspin

Tasks for the taking

I recently interviewed Michael Turner, vice president of marketing at NetSolve in Austin, Texas. NetSolve runs other people's networks for them and does so at a cost that is usually far less than doing the network management in-house.

What intrigued me during the conversation was the term that NetSolve uses for its services. The company refers to what it does as "out-tasking."

Turner explained that the difference between out-tasking and outsourcing is that in the latter, you are essentially handing off complete control of an entire activity to another organization that you are betting is competent and capable.

MARK GIBBS

While outsourcing works in some cases for some organizations, not everyone wants to put his fate in the hands of another party. NetSolve's edge is that the company is offering services that clients can easily take back if they wish.

The idea of out-tasking is powerful, and the name is good for all sorts of services offered by a variety of companies. Consider, for example, computer products retailer NECX. NECX has a full-fledged Web storefront, but it offers something more: the Enterprise Purchasing service.

This out-task service manages purchases made by line managers in an organization. The system, which uses a combination of Web forms and e-mail for notifications, allows an administrator to assign manager accounts and set spending limits.

There's also a provision for referring purchase requests that exceed preset limits to an administrator for approval.

What's so special about this? The fact that the software and the data reside on NECX's system means clients using the service don't have to build those services themselves. And they don't have to manage the data, do backups or fix bugs. The clients are out-tasking.

In this case the out-tasking is apparently free.

But in fact there's a cost: lock-in. Once you out-task to NECX in any area of operations and you've got five or 10 people using it, you are committed.

If anything should go wrong with the out-tasking — lost data, poor availability, bad technical support and so on — you'd find it extremely hard to go elsewhere. Not only is your organization used to the system, but the effort to go elsewhere would be too great.

Of course, for the firm providing the service there also are risks. To begin with, once a client is comfortable with the system, the out-tasker better not change anything and tick off the clients.

You can see there's a complex dynamic here. Each party is making trade-offs and betting that the deal will work and can be managed. And you can also see, if you look carefully enough, what the future of out-tasking will look like: Many of these services will be provided free over the Internet, (paid for by advertising), or available to you on a subscription basis.

Out-tasked services that come to mind are free e-mail services, such as Hotmail, and the Federal Express and UPS billing and tracking systems. There's also file archiving, Web content analysis and proofing, news filtering. . . . It is becoming a pretty long list.

Another good example is Click2Send (www.click2send.com), a company with which I'm involved. Click2Send is a file transfer mechanism that uses Web browsers to send and receive files, a much simpler proposition than attaching messages to e-mail or learning File Transfer Protocol.

<digression>I'd be grateful if you tried out Click2Send and let me know your thoughts. </digression>

Mark my words: Out-tasked services, particularly free ones, will become key elements in the e-commerce world.

Out-task your comments to nwcolumn@gibbs.com.

'NET BUZZ

PAUL MCNAMARA

Software.com isn't one of *those* dot.com companies, meaning it has real products, real customers and impressive revenue growth, not just a wacky marketing scheme and a wad of venture capital cash. Based on both coasts — Santa Barbara, Calif., and Lexington, Mass. — the company has been making e-mail servers for service providers almost since the beginning of Internet time. . . . OK, since January 1993.

They make really good e-mail servers, too, at least according to every customer and industry analyst who has ever ventured an opinion to this reporter. We're talking Chinese Army-type scalability here and uptime that would let any insomniac rest easy. AT&T, Excite, Ameritech and PSINet are among those companies that rely on Software.com servers to move mountains of customer e-mail.

One more factoid before we get to the point here, which is not to get me a PR job: Software.com claims there are 37 million people on this planet receiving their e-mail from Software.com servers.

OK, here comes the "but."

Last month, Software.com filed for a $69 million initial public offering, which has yet to be scheduled. Underwriters include Credit Suisse First Boston, Merrill Lynch & Co. and BancBoston Robertson Stephens . . . . No tin-cup rattling here.

Yes, yes, the point, the point.

Software.com may make terrific e-mail software, but the 6-year-old company does not make money. Last year's loss was $7.4 million, with the total tab since '93 running to almost $22 million, according to the company's S-1 filing with the Securities and Exchange Commission.

Granted, that's not much red ink in today's Web world, where dot.coms can squander such sums before lunch, but it does beg the question: Exactly what does it take for an Internet company to start turning a profit?

Last week I would have paid good money to have had an investment account at St. Louis-based **Edward Jones & Co.**, the nation's ninth-largest brokerage.

Canceling that account would have given me such great pleasure.

Edward Jones, in case you missed the news, recently fired 19 employees for what is apparently becoming an unpardonable sin these days: "Internet abuse." According to news reports, the brokerage issued a memo April 29 urging employees to admit it if they had sent dirty jokes or pictures over the company e-mail system. Forty-one workers who stepped forward received reprimands, while 19 others who did not got sacked.

We're talking about 19 fellow human beings with spouses, children, mortgages, dreams and now, thanks to the petty tyrants who run Edward Jones, shredded careers in the financial services industry.

"When people get Internet access at Edward Jones, **they know the policy of the firm,**" huffed a company henchwoman.

One would hope that the 17,000 employees at Edward Jones know something else, too: That it's time to find a more enlightened workplace. Such places do still exist.

***Business Week* asks Bill Gates** what future technology will dramatically change people's lives, and, among The All Powerful One's answers we get this gem:

"If you have a PC at home and use the Web to buy products such as a car, a TV or a dishwasher, and if you can use your PC to track the warranties, find the nearest repair center, and have your PC store remind you of all that information — that would be dramatic."

Excuse me, Your Eminence, but I can manage those tasks today quite nicely with a file cabinet and a phone book. Dramatic would be a Windows operating system that didn't need a warranty or a repair center.

The only sure-fire way to get McNamara to stop being so curmudgeonly is to feed him your Internet news tips at (508) 820-7471 or pmcnamara@nww.com.

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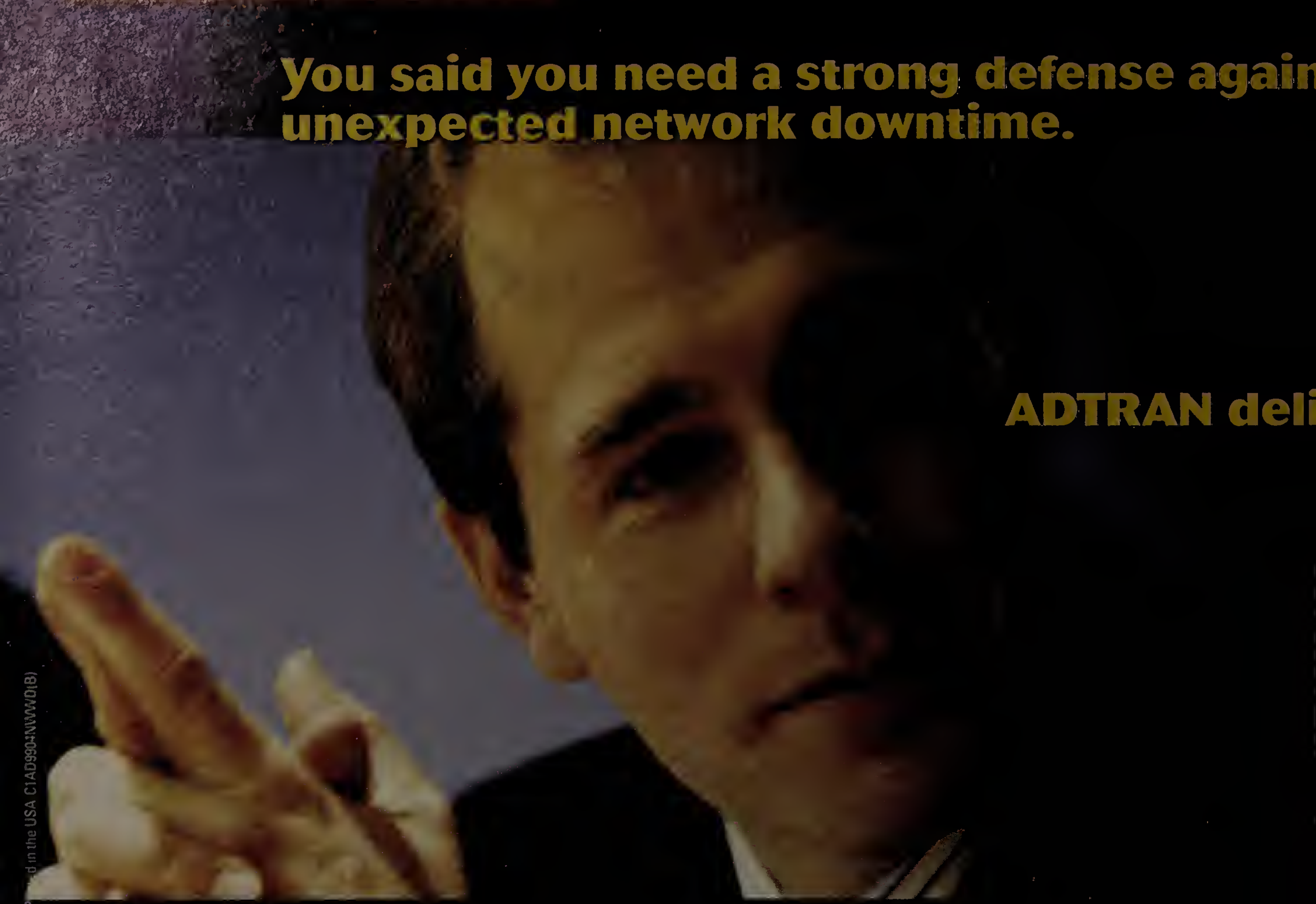

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